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511 Readiness in Canada

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511 Readiness in Canada

Prepared by
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NOTICES

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Since some of the accepted measures in the industry are imperial, metric measures are not always used in this report.

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The Transportation Development Centre of Transport Canada served as technical authority for this project.

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16. Abstract

The Canada 511 system will provide users with three-digit dialling access to weather and travel information nationwide. Government and NGO agencies, grouped as the Canada 511 Consortium, guide the development of the Canada 511 program.

The primary objectives of this project were to (i) prepare a Development Plan that defines the steps necessary to deploy Canada 511, and (ii) conduct a number of the Development Plan component tasks to provide guidance and assistance to the Canada 511 Consortium.

The project involved the completion of five early tasks from the Development Plan.

1. A *Literature Review* illustrated 511 systems benefits and the factors that influence commissioning, operations and maintenance costs.
2. A *Stakeholder Needs Survey* demonstrated that there is a wide variety of opinion concerning agency ATIS needs and deployment intentions.
3. A *Project Website* distributed project information to stakeholders. The website will also serve as a deployment status website for the Canada 511 Consortium.
4. Draft *Functional Requirements for Canada 511* provided system and operational development guidelines for potential Canada 511 deployers.
5. Proposed *Deployment Standards and Guidelines* outlined the operational standards for Canada 511 and suggested strategies for the delivery and presentation of 511 services.

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16. Résumé

Le système Canada 511 est un numéro de téléphone à trois chiffres qui donnera accès à un service d'information des voyageurs et de renseignements météorologiques à la grandeur du pays. Des organismes gouvernementaux et des organismes non gouvernementaux (ONG), regroupés au sein du Consortium Canada 511, pilotent le programme Canada 511.

Le présent projet avait pour objectifs (i) d'élaborer un Plan de développement énumérant les tâches nécessaires au déploiement du service Canada 511 et (ii) d'accomplir les premières tâches du Plan de développement, afin d'orienter le travail ultérieur du Consortium Canada 511.

Les cinq premières tâches du Plan de développement ont été réalisées au cours du projet.

1. Une *recherche documentaire* a mis en évidence les avantages des systèmes 511 et les facteurs qui influent sur les coûts de mise en service, d'exploitation et d'entretien de tels systèmes.
2. Une *enquête auprès des parties intéressées* a révélé chez celles-ci une grande diversité d'opinions quant à leurs besoins et leurs intentions concernant le déploiement de systèmes ATIS.
3. Un *site Web* a été créé pour diffuser l'information sur le projet aux parties intéressées. Le même site Web servira à renseigner le Consortium Canada 511 sur l'état de déploiement du service 511.
4. Une ébauche des *exigences fonctionnelles de Canada 511* a été établie à l'intention des organismes qui participeront au déploiement de Canada 511. Ces exigences leur serviront de lignes directrices pour la conception et la définition opérationnelle du système.
5. Une proposition de *normes et lignes directrices de déploiement* a défini les normes opérationnelles pour le service Canada 511 et suggéré des stratégies pour la prestation et la présentation de ces services d'information aux voyageurs.

17. Mots clés
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EXECUTIVE SUMMARY

Background

In January 2004, IBI Group was awarded research funding for its proposal "511 Readiness in Canada" by Public Works and Government Services Canada under the Innovation Through Partnership Program, a part of the Intelligent Transportation Systems Research & Development Plan for Canada. The program is managed by the ITS Office of Transport Canada.

In the United States, many states provide a 511 service to facilitate public access to various forms of travel information. In Canada, a similar movement to provide travel and weather information through a 511 service is being led by the Canada 511 Consortium that (as of February 2005) comprises ITS Canada, the Transportation Association of Canada, Transport Canada, Environment Canada, the Canadian Urban Transit Association, and representatives from each of the provinces and the Yukon Territory. The Consortium was struck in the fall of 2003, and its early focus has been to secure the use of the 511 telephone number through an application to the federal licensing body, the Canadian Radio-Television and Telecommunications Commission (CRTC). Its broader mandate includes the establishment of overall Canada 511 Development Plan describing the larger context of the planning, consultation, negotiation and deployment tasks necessary to realize a nationwide Canada 511 system. The objectives of the Canada 511 Consortium are to (i) facilitate implementation of the Canada 511 system, (ii) promote consistency amongst deployments, and (iii) encourage standards in the deployed level of user services, data quality, and data availability. These objectives are supported by the results of a Literature Review conducted as part of this project that demonstrated how advanced traveller information systems (ATIS), and 511 systems in particular, benefit the general public, public agencies and the private sector.

The primary objectives of this project were to develop a Canada 511 Development Plan and to conduct a number of the Development Plan component tasks in order to provide guidance and support to the activities of the Canada 511 Consortium.

Draft Canada 511 Development Plan

A draft Canada 511 Development Plan was constructed to guide the various tasks associated with establishing the Canada 511 system. These included defining the functional requirements based on user and deployer needs, addressing the many regulatory and legal requirements prior to system deployment, designing the system itself (accounting for all compatibility and telecommunication needs), and establishing the business model and institutional framework for the operation of the system. The draft Development Plan provides a good basis to move forward with many of the necessary deployment tasks related to travel information, but must be more fully integrated with Environment Canada's preparations.

Canada 511 Vision

The Canada 511 system will provide users with three-digit dialling access to pre-trip and en-route information on travel and weather conditions nationwide. The system will contain both static (non-changing or infrequently changing) and real-time (automatically and continuously updated) information concerning weather and travel conditions. The traveler component may provide information on congestion, road and lane closures related to construction, special events, or traffic congestion causing delays for businesses and the general public, as well as trip and schedule information from public and private transportation systems (e.g., public transit buses, motor coaches, ferries, trains) as appropriate for the local deploying agency.

Stakeholder Needs Survey

The *Stakeholder Needs Survey* demonstrated that there is a wide variety of opinion concerning agency ATIS needs and deployment intentions. However, it was conclusive regarding the local industry's approach to preferred content and information delivery technologies. Specifically, provincial agencies are focussed on road condition reporting, municipal agencies on road closure reporting, and transit agencies on fare, schedule and trip planning information. All agencies surveyed are currently providing some form of traveller information and most have plans to deploy additional services in the next few years. The related project website will be supported and expanded in function beyond the schedule of IBI Group's current project with Transport Canada. It will act as a key tool for distributing background information to Canada 511stakeholders and will, in the future, evolve to provide the Canada 511 Consortium with a comprehensive Deployment Status website.

Canada 511 Functional Requirements

The draft *Functional Requirements for Canada 511* were developed to provide system and operational development guidelines for potential Canada 511 deployers. They provide a significant degree of direction with respect to system development, the types of travel information types proposed for Canada 511, data management, and standards for data sharing and dissemination.

Proposed Deployment Standards and Guidelines

The *Proposed Deployment Standards and Guidelines* were developed to outline the operational standards for Canada 511 and suggest a number of strategies for the delivery and presentation of these traveller information services. While a significant level of detail and content is presented within the Guidelines, it should be noted that many Development Plan tasks, and the Functional Requirements in particular, must be completed before these Guidelines can be finalized.

Future Canada 511 Development Activities

In addition to defining the Development Plan itself, the current project completed a number of early Development Plan tasks, including:

- A literature review on best practices in ATIS;
- A survey and review of stakeholder needs;
- Draft functional requirements; and
- Draft deployment guidelines.

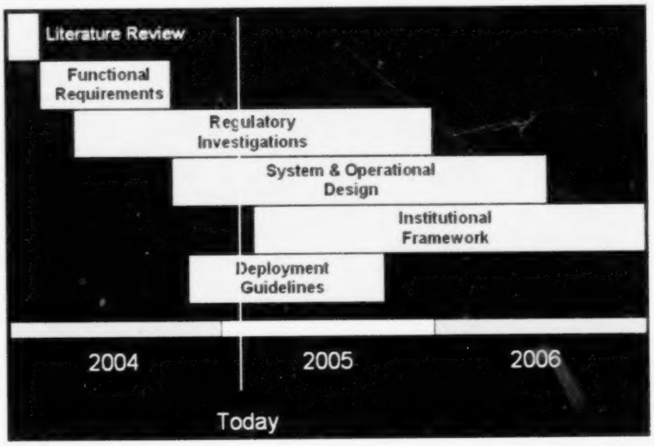

Figure 1: Canada 511 Development Plan

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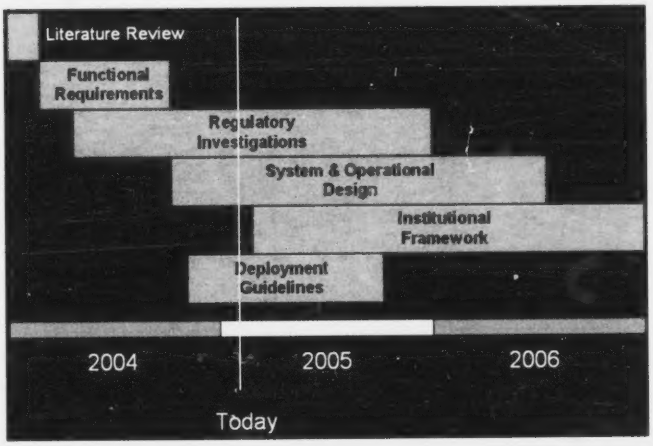

Figure 1: Canada 511 Development Plan

As illustrated in Figure 1, some of these tasks were completed as part of this project, while the Canada 511 Consortium will carry others forward to completion. These future tasks include:

- Completion of the CRTC application process;
- Investigations into associated regulatory and legal requirements, including privacy issues, partnering agreements, and intellectual property rights;
- Completion of the high-level system design considerations, including the telecommunications strategy and the integration between local systems and the Environment Canada systems; and
- Identification of the supporting institutional framework and associated business plan.

It is estimated that the Canada 511 Consortium will need approximately 20 months and appropriate funding resources to complete the remainder of the Development Plan.

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Contexte

En janvier 2004, Travaux publics et Services gouvernementaux Canada accordait des fonds de recherche au Groupe IBI pour qu'il mène à bien sa proposition de préparer le Canada au déploiement d'un service 511. Ces fonds étaient accordés en vertu du Programme d'innovation en partenariat, dans le cadre du Plan de recherche et de développement des Systèmes de transports intelligents pour le Canada, géré par le Bureau des STI de Transports Canada.

Aux États-Unis, de nombreux États offrent un service 511 pour faciliter l'accès du public à diverses formes de renseignements utiles lors de déplacements. Au Canada, le Consortium Canada 511 pilote un mouvement semblable qui vise l'instauration d'un service 511 d'information des voyageurs et de renseignements météorologiques. Ce Consortium regroupe à ce jour (en février 2005) STI Canada, l'Association des transports du Canada, Transports Canada, Environnement Canada, l'Association canadienne du transport urbain et des représentants des dix provinces canadiennes et du territoire du Yukon. Créé à l'automne 2003, le Consortium s'est donné comme toute première mission de se réserver l'utilisation exclusive du numéro abrégé 511, en déposant une demande auprès de l'organisme fédéral responsable de l'octroi de licences, le Conseil canadien de la radiodiffusion et des télécommunications (CRTC). Le mandat général du Consortium comprenait l'établissement d'un Plan de développement d'un service 511 dans tout le Canada, lequel devait décrire les tâches de planification, de consultation, de négociation et de déploiement nécessaires à la mise en place d'un système Canada 511 pancanadien. Les objectifs précis du Consortium Canada 511 sont (i) de faciliter la mise en œuvre du système Canada 511, (ii) de promouvoir l'uniformisation dans le déploiement des systèmes 511 et (iii) d'encourager la normalisation du niveau de services aux utilisateurs, de la qualité des données et de la disponibilité des données. Les résultats de la recherche documentaire effectuée dans le cadre du présent projet appuient ces objectifs en montrant comment les systèmes avancés d'information des voyageurs (ATIS, pour *Advanced Transport Information Systems*), et en particulier les systèmes 511, bénéficient à la fois au grand public, aux organismes publics et au secteur privé.

Les principaux objectifs du présent projet étaient d'élaborer un Plan de développement de Canada 511 et d'accomplir les premières tâches du Plan de développement, afin d'orienter le travail ultérieur du Consortium Canada 511.

Ébauche du Plan de développement de Canada 511

Une ébauche de Plan de développement de Canada 511 a été élaborée afin de situer l'ensemble des tâches devant mener à l'établissement du système Canada 511. Ces tâches comportaient l'élaboration d'exigences fonctionnelles capables de répondre aux besoins des utilisateurs et des organismes engagés dans le déploiement du service 511, le règlement préalable de nombreuses questions réglementaires et législatives, la conception du système comme tel (en tenant compte de tous les besoins de compatibilité et d'interopérabilité avec les réseaux de télécommunication) et l'établissement d'un modèle de fonctionnement et d'un cadre institutionnel pour l'exploitation du système. L'ébauche du Plan de développement donne une base solide pour lancer beaucoup des tâches de déploiement reliées au volet «information des voyageurs», mais il reste à mieux l'adapter aux travaux préparatoires d'Environnement Canada (pour le volet «météo»).

La vision de Canada 511

Le système Canada 511 est un numéro de téléphone à trois chiffres qui donnera accès à un service d'information des voyageurs et de renseignements météorologiques, avant et pendant les déplacements. Le système contiendra à la fois une information statique (qui change rarement ou jamais) et une information en temps réel (mise à jour continuellement et automatiquement) sur la météo et les conditions routières. Le volet «voyageurs» fournira aux entreprises et au grand public de l'information sur les congestions, les fermetures de routes et de voies pour cause de travaux, les événements spéciaux ou les embouteillages causant des retards, de même que de l'information sur les itinéraires et les horaires de sociétés publiques et privées de transport (p. ex., autobus urbains, autocars, traversiers, trains), selon ce que jugera approprié l'organisme qui déploiera localement le service 511.

Enquête sur les besoins des parties intéressées

L'*enquête auprès des parties intéressées* a révélé chez celles-ci une grande diversité d'opinions quant à leurs besoins et leurs intentions concernant le déploiement de systèmes ATIS. Elle s'est toutefois révélée probante concernant les préférences des industries locales en matière de contenu et de technologie de diffusion de l'information. Ainsi, tandis que les organismes provinciaux se préoccupent avant tout de transmettre l'information sur l'état des routes, pour les organismes municipaux, la priorité va à l'information sur les fermetures de routes, et pour les sociétés de transport en commun, il importe surtout d'informer les gens sur les tarifs et les horaires et de les aider à planifier leurs déplacements. Tous les répondants à l'enquête diffusent actuellement de l'information aux voyageurs sous une forme ou une autre, et la plupart prévoient diversifier leurs services d'ici quelques années. Le site Web du projet sera maintenu après la fin des travaux menés par le Groupe IBI en collaboration avec Transports Canada. Il servira alors d'outil privilégié pour transmettre l'information de base aux parties intéressées. Plus tard, il deviendra un lieu où les membres du Consortium Canada 511 pourront se tenir au courant de l'état du déploiement du service 511.

Exigences fonctionnelles de Canada 511

Une ébauche des *exigences fonctionnelles de Canada 511* a été établie à l'intention des organismes qui participeront au déploiement de Canada 511. Ces exigences leur serviront de lignes directrices pour la conception et la définition opérationnelle du système. Elles donnent des orientations précises concernant le développement du système, le type d'information pour voyageurs à inclure dans le système Canada 511 et la gestion des données, et proposent des normes pour le partage et la diffusion des données.

Projet de normes et lignes directrices de déploiement

Le projet de *normes et lignes directrices de déploiement* comprend les normes opérationnelles pour le service Canada 511 et suggère des stratégies pour la prestation et la présentation de ces services d'information aux voyageurs. Ces lignes directrices sont passablement détaillées et leur contenu, assez au point. Il convient toutefois de noter que beaucoup des tâches du Plan de développement, en particulier la définition des exigences fonctionnelles, devront être achevées avant que l'on puisse élaborer ces lignes directrices dans leur forme finale.

Activités futures de développement de Canada 511

Le présent projet a consisté à élaborer le Plan de développement comme tel, puis à réaliser les premières tâches du plan, soit :

- recherche documentaire sur les pratiques optimales en matière de système ATIS;
- enquête auprès des parties intéressées et revue de leurs besoins;
- ébauche des exigences fonctionnelles;
- ébauche des lignes directrices de déploiement.

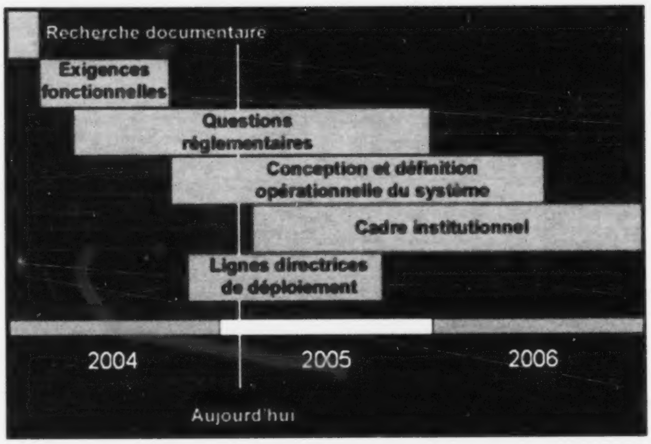

Figure 1: Plan de développement de Canada 511

Comme l'illustre la figure 1, certaines des tâches du Plan de développement ont été réalisées au cours du présent projet. Le Consortium Canada 511 s'occupera de mener les autres à bonne fin. Voici les tâches qu'il reste à faire :

- mener à terme le processus de demande au CRTC;
- étudier les questions réglementaires et législatives, y compris celles qui ont trait à la protection de la vie privée, aux ententes de partenariat et aux droits de propriété intellectuelle;
- définir les critères généraux de conception du système, y compris la stratégie de télécommunications et l'interopérabilité entre les systèmes locaux et les systèmes d'Environnement Canada;
- définir le cadre institutionnel et le modèle de fonctionnement connexe.

On estime que le Consortium Canada 511 aura besoin d'environ 20 mois et de ressources financières en conséquence pour réaliser le reste du Plan de développement.

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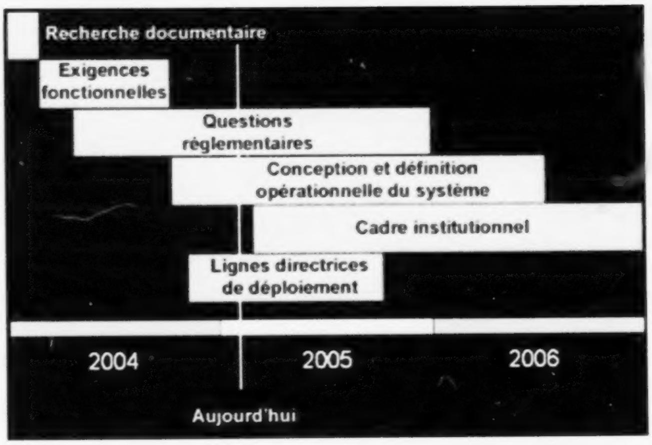

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GLOSSARY

The following definitions and acronyms are provided for reference within this document.

511C	Canada 511 Consortium
ATIS	Advanced Traveller Information System
ATMS	Advanced Traffic Management System
Canada 511 Consortium, or 'the Consortium'	A working group of parties co-funding development activities that support the development of the 511 system. As of February 2005, the Consortium comprises ITS Canada, the Transportation Association of Canada, the Canadian Urban Transit Association, Environment Canada, Transport Canada, and representatives from each province and the Yukon Territory.
Canada 511 System	A reference to the broad network of system infrastructure and operational processes facilitating data collection, fusion, and telephony dissemination that will collectively be known as Canada 511.
Canada 511 Service	A reference to the broad scope of services and products to be supplied by the various deployers participating in the Canada 511 system.
CCTV	Closed Circuit Television
CRTC	Canadian Radio-Television and Telecommunications Commission
CUTA	Canadian Urban Transit Association
CVO	Commercial Vehicle Operations
FHWA	Federal Highway Administration (U.S.)
Deployers	Any federal, provincial, or local agency responsible for the commissioning of an information service that will form part of the Canada 511 system.
ITS	Intelligent Transportation Systems
IVR	Interactive Voice Response
MOU	Memorandum of Understanding
N11	Dedicated 3-digit numbers (e.g., 911, 411)
Q&A	Questions & Answers
XML	Extensible Mark-up Language

1. INTRODUCTION

1.1 Background

Project Description

In January 2004, IBI Group was awarded research funding for its proposal "511 Readiness in Canada" by Public Works and Government Services Canada under the Innovation Through Partnership Program, a part of the Intelligent Transportation Systems Research & Development Plan for Canada. The program is managed by the ITS Office of Transport Canada.

The funding for this project constitutes Transport Canada's financial contribution to the operation and advancement of the Canada 511 Consortium, a group of public agencies and non-governmental organizations providing funding in support of the application to the Canadian Radio-Television and Telecommunications Commission (CRTC) to have the 511 number assigned to the proposed traveller information service, Canada 511.

History of the 511 Traveller Information Service

In the United States, a 511 Deployment Coalition has been working for the past several years to support the deployment of 511 nationally. The coalition is made up of senior representatives of federal and state governments, national transit advocates and private sector representatives within the industry. The role of the 511 Deployment Coalition is to support the ongoing introduction of 511 systems by local and state agencies. It will provide a federal lobby and supply local deployers with the marketing tools and implementation standards and guidelines necessary to establish a system. By gradually stitching together various 511 systems developed at the state, regional and municipal levels, all under the same deployment guidelines, a cohesive and uniform national system is emerging.

Role of the Canada 511 Consortium

For a number of years, ITS Canada has been monitoring the developments in the United States and laying the groundwork for a Canada 511 Consortium ("the Consortium", or 511C). The Consortium was struck in the fall of 2003 and currently comprises ITS Canada, the Transportation Association of Canada, Transport Canada, Environment Canada, the Canadian Urban Transit Association, and representatives from each province and the Yukon Territory. The Consortium's early focus has been to secure the use of the 511 telephone number through an application to the federal licensing body, the CRTC.

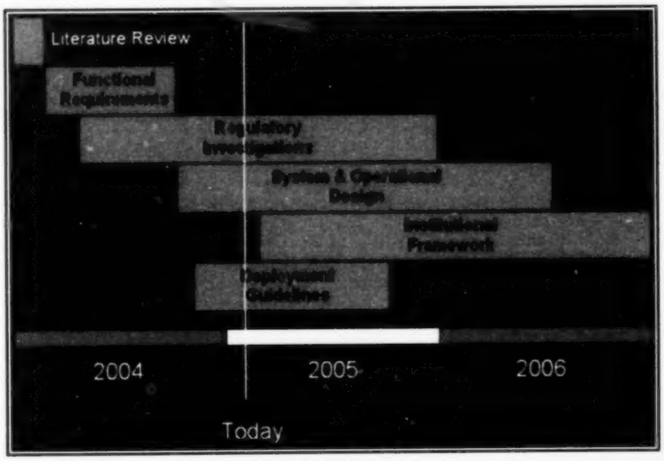

Figure 1: Canada 511 Development Plan

However, the mandate of the Consortium is broader than the CRTC application. The Consortium is to carry forward an overall Canada 511 Development Plan (the "Development Plan" – see Figure 1) that would set the earlier efforts of ITS Canada into the larger context of the planning,

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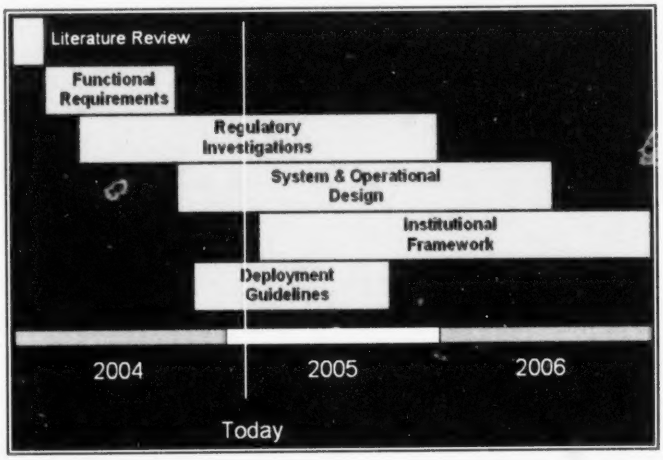


Figure 1: Canada 511 Development Plan

However, the mandate of the Consortium is broader than the CRTC application. The Consortium is to carry forward an overall Canada 511 Development Plan (the "Development Plan" – see Figure 1) that would set the earlier efforts of ITS Canada into the larger context of the planning, consultation, negotiation and deployment tasks necessary to realize a nationwide Canada 511 system.

The objectives of the Canada 511 Consortium are to:

- Facilitate implementation of the Canada 511 system;
- Promote consistency amongst deployments; and
- Encourage standards in the deployed level of user services, data quality, and data availability.

The Canada 511 Vision

The Canada 511 service will provide users with three-digit dialling access to information on travel and weather conditions nationwide. The system will contain both static (non-changing or infrequently changing) and real-time (automatically and continuously updated) information concerning weather and travel conditions.

The weather component, operated primarily by Environment Canada, will provide an array of weather-related services. In addition to weather conditions affecting road surface conditions, the weather component will provide specialized information and services for marine, agricultural, aviation, and other stakeholders and clients. The travel conditions component will deal with natural occurrences affecting the movement of people along road sections. This will necessarily overlap with the traveller component of the system.

Depending on the deploying agency's needs (and the types of information to which it has access), the traveller component will provide information on congestion, road and lane closures related to construction, winter maintenance and road conditions, special events, and traffic congestion causing delays for businesses and the general public, as well as trip and schedule information from public and private transportation systems (e.g., public transit buses, motor coaches, ferries, and trains). The traveller component will not have a centralized architecture. Instead, it will be operated by a network of local traveller information providers.

The Canada 511 system will principally employ a telephone interface to provide this information to its clients. This will provide the widest possible access to the information, both pre-trip and en-route. However, a complementary 511 website may be part of this vision, enhancing the delivery of this same information using visual media.

1.2 Scope and Objectives of this Report

This report is intended as an overview and summary of the project tasks for the *511 Readiness in Canada* project conducted by IBI Group for Transport Canada. The primary deliverable of this project was a Canada 511 Development Plan that will guide the deployment of the Canada 511 system over the next couple of years. The remaining deliverables for the project were the outcomes of some of the tasks within this overall Canada 511 Development Plan.

This report has been structured to:

- Document the work process followed and tasks completed;
- Outline the results achieved on the main deliverables; and
- Identify the required follow-up work necessary to continue the Development Plan effort.

The remaining deliverables are appended as follows:

Appendix A	Canada 511 Development Plan (June 2004)
Appendix B	Canada 511 Literature Review and Industry Assessment (June 2004)
Appendix C	Summary of Canadian ATIS Stakeholder User Needs and Opportunities (October 2004)
Appendix D	Canada 511 Functional Requirements (February 2005)
Appendix E	Proposed Canada 511 Deployment Standards and Guidelines (February 2005)

2. THE “511 READINESS IN CANADA” PROJECT

2.1 Approach

A summary of the work plan developed for the 511 Readiness in Canada project is provided in Table 1. The summary identifies the original schedule, objectives, and completion status for each task.

Table 1: Summary of Project Tasks

Tasks with Deliverables	Objectives
Milestone Task 1 – Work Plan and Methodology Report	
1.1 Project Initiation	To begin the Project with a clear understanding of the Project Team tasks, areas of responsibility, and lines of communication. Completed: January 2004
1.2 Work Plan and Methodology Report	To review and update the Work Plan outlined in the Proposal to complete a comprehensive Work Plan and Methodology Report that fulfils the objectives of the Project and reflects the direction of the Steering Committee. Completed: February 2004
Milestone Task 2 – Literature Review	
2.1 Literature Review and Industry Assessment	To produce a literature review focussing on (i) the benefits of state-of-the-art telephone-based ATIS in North America and selected locations overseas, and (ii) the lessons learned in such deployments. Completed: June 2004
2.2 Survey of Stakeholder Needs	To identify potential 511 system ‘deployer needs’ as input to the development of functional requirements for Canada 511. Completed: September 2004

Tasks with Deliverables	Objectives
2.3 Summary of Canadian ATIS Stakeholder User Needs and Opportunities	To compare and contrast the existing Canadian telephone-based ATIS needs with available infrastructure to identify any deficiencies. Completed: October 2004
Milestone Task 3 – Mid-Point Interim Review	
3.1 Functional Requirements for Canada 511	To draft the desired system functionality for Canada 511, based on known requirements and the outputs of Task 2.1 - Literature Review and Industry Assessment. Completed: February 2005
Milestone Task 4 – Final Review and Draft Final Report	
4.1 Deployment Standards and Guidelines	To draft deployment guidelines that set standards in presentation of information, user interface, data management, data sharing, etc. Completed: February 2005
5. Final Report and Summary	To document the study process and results. Completed: March 2005

The schedule was to complete this Work Plan by the end of March 2005. Schedule problems occurred in the spring of 2004 when survey results were not returned in time to avoid summer vacation schedules. This delayed the completion of the survey until September. This affected subsequent tasks that relied on the outputs from the Survey results. To compensate, additional resources were applied to shorten the duration of later tasks in the Work Plan. As a result, the project was completed on time.

2.2 Procedures

2.2.1 A Canada 511 Development Plan

In preparing the Canada 511 Development Plan for the deployment of a 511 system across Canada, a systems engineering approach was taken, incorporating the project directions discussed at the first Steering Committee meeting and lessons learned from a number of sources, including various 511 and other Advanced Traveller Information System (ATIS) deployments across Canada, the United States, and the United Kingdom. The *Canada 511 Development Plan ver 0.2* (June 2004) is included as **Appendix A** of this report. It includes background on the project, the objectives for Canada 511, and a synopsis of the Literature Review. The document further describes the following required tasks:

- Develop Functional Requirements for the system through an initial stakeholder needs survey, subsequently refined based on feedback from broad stakeholder consultation on the draft Functional Requirements;

- Assess the regulatory and legal requirements necessary to deploy the system (includes the development and management of the application to the CRTC to establish the 511 number as the travel and weather information access number), assess the privacy and data ownership rights issues, and explore the need for partnering agreements for data sharing;

- Design the system, establish operational framework to incorporate Environment Canada and local ATIS deployer needs, and explore the institutional issues that may arise through the involvement of the telecommunications industry;

- Design the institutional framework, including institutional support, the development of the system business model, and the identification of funding mechanisms; and

- Develop a deployment process describing the overall deployment process, schedule and institutional framework (important accompanying documentation would include deployment guidelines for local agencies).

As the Canada 511 Consortium moves forward with the Development Plan, periodic updates will be necessary to reflect new task requirements and to reflect assignments of resources to specific tasks.

The creation of the draft Canada 511 Development Plan was completed in isolation from the design activities internal to Environment Canada. Consequently, the Development Plan may not reflect the entire scope of tasks required within that organization. The Development Plan will be carefully reviewed by Environment Canada to ensure that it reflects its desirable/required development processes.

2.2.2 Literature Review and Industry Assessment

A Literature Review was identified as one of the early tasks in the Development Plan, and was conducted as part of this project for Transport Canada. The Literature Review and Industry Assessment (June 2004) is included as **Appendix B** of this report.

The Literature Review examined over 100 documents that were specifically relevant to the 511 ATIS development effort. In addition to IBI Group's experience in developing like systems in the United States, a considerable amount of information is available through the U.S. Federal Highway Administration (FHWA) concerning:

- The benefits of state-of-the-art telephone-based ATIS in North America and selected locations overseas, and
- The lessons learned in such deployments.

In addition to a discussion concerning the benefits and costs of 511 systems and ATIS in general, the Literature Review provides insights to the following aspects of the development effort:

- system planning;
- regulatory and legal issues;
- telecommunications issues;
- institutional framework issues;
- the U.S. Deployment Coalition's 'Deployment Assistance Reports'; and
- project scheduling issues and strategies.

2.2.3 Survey of Stakeholder Needs

As a precursor to developing the system functional requirements, it was determined that a preliminary prioritization of stakeholder ATIS needs should be confirmed through a survey. This preliminary input would support the development of draft Functional Requirements that would, in turn, be used to solicit broader stakeholder input.

The survey process comprised three discrete steps:

1. The development of a participants list that represented transportation agencies potentially interested in the deployment of Canada 511 services;
2. A website that provided project background and information regarding 511; and
3. A web survey that allowed participants to enter their information directly into a database for future analysis.

Participants List

A draft list of participants was forwarded to Transport Canada on April 26, 2004, and through various revisions, a list of representatives was finalized as follows:

- The ministries responsible for transportation in each province and territory
- Both the traffic (and/or information technology) departments and the transit agencies for each of the following cities:

  Vancouver
  Edmonton
  Calgary
  Regina
  Saskatoon
  Winnipeg
  Hamilton
  Toronto
  Ottawa
  Montreal
  Quebec City
  Fredericton
  Halifax
  St. John's

- The following national and regional transit carriers:

  VIA Rail
  GO Transit (greater Toronto area)
  AMT: Agence métropolitaine de transport (greater Montreal area)
  Greyhound

- Public Safety and Emergency Preparedness Canada (a federal agency)

Project Website

It was determined that a project website would be the best means of distributing background information to the survey participants, other potential stakeholders and interested parties. The project website draft content was developed, including:

- background to the Canada 511 initiative;
- the role of the Canada 511 Consortium;
- a vision statement for the Canada 511 system;
- scope and objectives for the Canada 511 Development Plan;
- contact information for Paul Frigon, the designated lead contact for the Canada 511 Consortium; and
- a copy of the Preliminary Deployer Needs survey.

Once draft website content was established, a prototype was prepared for testing. Testing was completed and the website finalized in early 2004 to provide survey participants with review material. The University of Waterloo led the construction of the website itself. The website address is **www.511canada.ca**.

Web Survey

The web survey was designed to solicit input on ATIS deployer needs from the sample of key public and private sector stakeholders listed above. The survey asks a number of questions intended to determine the following:

- What services does the deploying stakeholder require?
- What services or products does its customers require?
- What expectations does a potential deploying agency have of a national Canada 511 system?

The survey began in June 2004 but, due to the summer vacation schedules, responses were generally slow to return. Consequently, the survey period was extended into the fall of 2004 to obtain a better return:

- Total number invited to participate in survey = 42 (100%)
- Number that could not commit to participating = 4 (10%)
- Number that completed their surveys = 32 (76% of those invited to participate)

The above noted levels of return were made possible through persistent follow-up work over a nine-week period, and represent a significantly high rate of participation.

A copy of the survey questions is found on the website (**www.511canada.ca**).

2.2.4 Survey of Canadian ATIS Stakeholder Needs and Opportunities

The survey identified key strategies that will be of importance to deployers across Canada. The Survey of Canadian ATIS Stakeholder User Needs and Opportunities (October 2004) is included as **Appendix C** of this report.

These stated needs assisted in the development of the draft Functional Requirements (**Task 3.1**) and will ultimately assist deployers in the identification of supporting infrastructure requirements. A key finding from the survey was that all the survey respondents from across the country indicated a need for traveller information services. These results were subsequently used as background information for the application to the CRTC for the assignment of the 511 number for traveller information purposes.

2.2.5 Functional Requirements for Canada 511

A draft set of functional requirements for Canada 511 was developed to provide system development guidelines for potential Canada 511 deployers. The Canada 511 Functional Requirements (February 2005) are included as **Appendix D** of this report.

In preparing these Functional Requirements, a guiding principle was to proceed (wherever possible) with the system concepts from:

- the tentatively planned system architecture identified at the first Steering Committee meeting;
- the U.S. 511 deployment experience; and
- the stakeholder requirements identified within the Survey of Stakeholder Needs (Task 2.2).

The Canada 511 Functional Requirements report provides insight into the following areas:

- A proposed overall Canada 511 system configuration;
- A vision for the operation of the system, both locally and on a national basis;
- The proposed travel information types proposed for Canada 511;
- Direction with respect to data management; and
- System standards for data dissemination.

2.2.6 Proposed Deployment Standards and Guidelines

A set of preliminary guidelines, the Proposed Canada 511 Deployment Standards and Guidelines, was developed to help guide content, system and process consistency amongst the local traveller information system deployments within the Canada 511 network. The Proposed Canada 511 Deployment Standards and Guidelines (February 2005) are included as **Appendix E** of this report.

The guidelines include:

- vision statement that describes the overall intent and objectives of the Canada 511 system;
- direction in travel data content (including "basic" and "optional" content);
- direction in travel data quality and consistency;
- service delivery guidelines for the Canada 511 phone system, call routing, and operations;
- an overview of lessons learned in American 511 system deployments; and
- references for additional 511 deployment information resources.

3. CONCLUSIONS

The work completed to date as part of this project, and by the 511 Consortium in its CRTC application, has provided an excellent start to the Canada 511 development program. However, there is a significant work yet to be completed within the Canada 511 Development Plan, and it will take a broad participation of stakeholders to see the Canada 511 system realized in the future.

The following sections summarize the conclusions of the 511 Readiness in Canada project.

Canada 511 Development Plan

The draft Canada 511 Development Plan is an excellent starting point to guide the Canada 511 Consortium in its efforts to establish the Canada 511 service across the country. This Development Plan was (and is) meant to be a first look at the activities that will be necessary to deploy Canada 511. It is based on best practices in ATIS, and looks to the 511 deployment experience in the U.S. for some important deployment lessons learned.

Canada 511 is intended to be a simple three-digit telephone access to local and regional weather and travel information systems, and it is intended to be available across the country. It will enable users to access information in a like fashion wherever 511 is provided. For example, users will not need to remember the number for various local public transit operators. Instead, they will be able to dial 511 to get access to the various transit operators in their area. Further, users from B.C. to Newfoundland will be able to access the same information in the same way.

The Development Plan emphasizes that Canada 511 is not in itself a traveller information system, and cannot replace any such system. Canada 511 will rely on existing traveller information systems to supply traveller information and services, and will simplify user access to this information.

The travel component will feature services that may be new or may already be provided by local agencies. Local deploying agencies will decide which information services will be provided. These may include winter road conditions, summer construction information, ferry schedules, public transit information, etc. The weather component will be primarily composed of the services offered by Environment Canada for (as examples) the aeronautics, agricultural, marine industries, etc. However, other weather services will also be featured and may include the outputs from road weather information systems, such as road and bridge icing conditions, and visibility conditions.

The Development Plan should be considered a living document, and one that requires continual updating to reflect the current status of the program, new tasks as they are identified, task completions and the effects of their outcomes, updated personnel assignments, and oversight to ensure that the tasks are satisfactorily completed in a timely fashion.

Literature Review

The results of the Literature Review demonstrated that ATIS, and 511 systems in particular, benefit the general public, public agencies and the private sector. Specific benefits to the public include improved public safety, improved travel time reliability, reduced travel costs, and more flexible travel choices.

ATIS assists public operating authorities in managing travel through periods of high congestion, disseminating information concerning construction, safety and special events, and may be used as a performance measurement tool. The private sector benefits as well. ATIS mitigates the factors that may affect the delivery of goods and services.

In addition to determining the benefits of ATIS, the Literature Review also determined that there is a wide range of potential commissioning, operations and maintenance costs amongst existing deployments. It was emphasized that the system architecture selected has a significant bearing on the total operations costs.

Stakeholder Needs Survey

Another task within the Development Plan, the Survey of Stakeholder Needs resulted in three key deliverables for the project. First, a *Participants List* for the survey represents key contacts within the Canadian organizations most likely to deploy a 511 system. These contacts may be of use to the Canada 511 Consortium in establishing further local representation on the 511C.

Second, a *Project Website* (**www.511canada.ca**) was established that acts as a key tool for distributing background information to Canada 511 stakeholders and providing a mechanism for feedback to the Consortium. At the end of the project in March 2005, the website will be handed over to the Canada 511 Consortium and will continue as the Canada 511 Consortium Deployment Status website.

Lastly, the *Survey of Stakeholder Needs* was conducted. A significantly high rate of return (82%) was achieved for the survey. It was conclusive regarding the local industry's approach to preferred content and information delivery technologies. Specifically, provincial agencies are focussed on road condition reporting, municipal agencies on road closure reporting, and transit agencies on fare, schedule and trip planning information. The survey illustrated the needs of potential system deployers and provided direction in terms of system content and development path that would best suit the needs of these stakeholders.

Functional Requirements

The draft Functional Requirements for Canada 511 were developed to provide system and operational development guidelines for potential Canada 511 deployers. They provide a significant degree of direction with respect to system infrastructure development, data management, standards for data sharing and dissemination, user interface and operational structures.

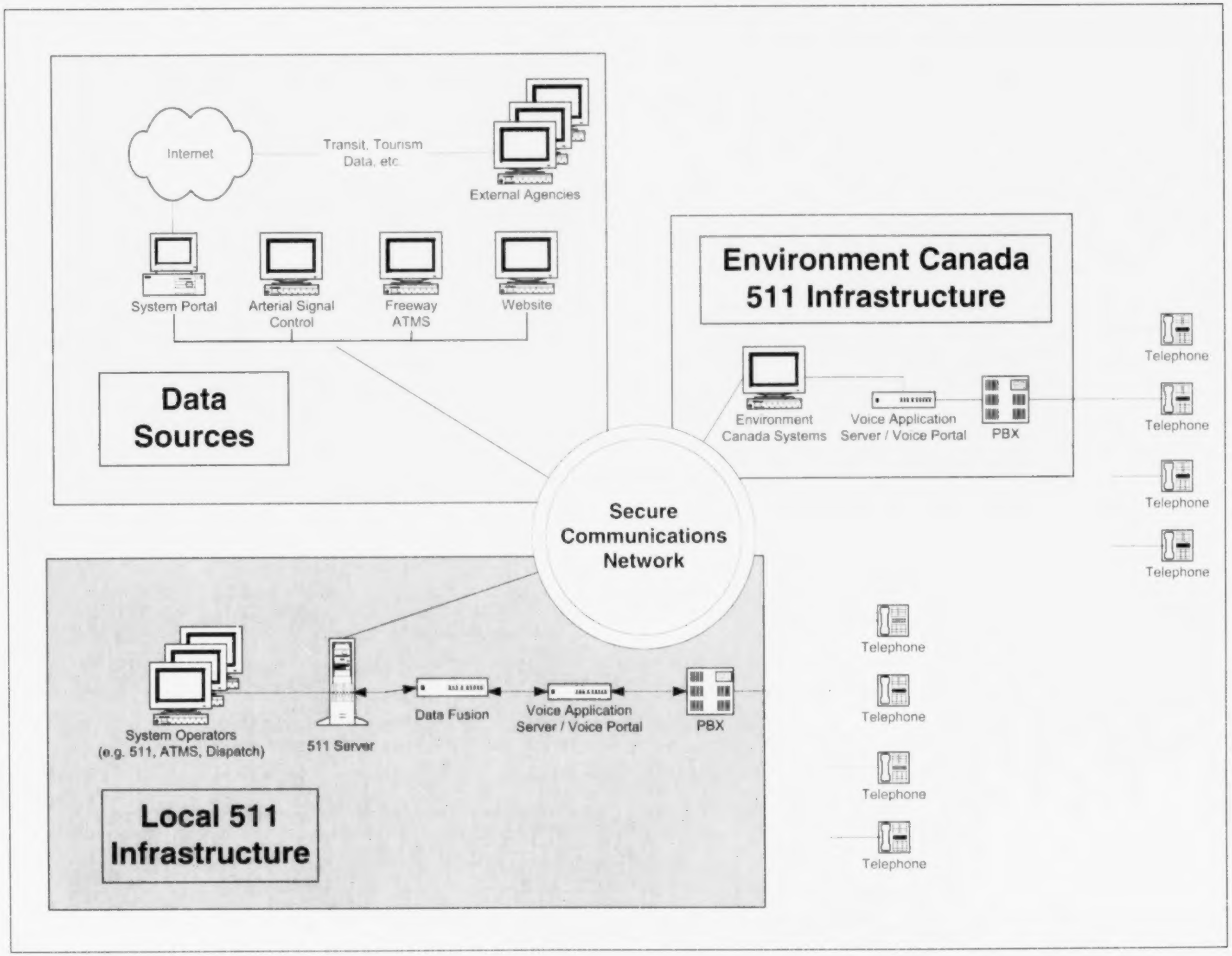
The Functional Requirements include:

- An overview of the Concept of Operations for Canada 511 that describes the proposed system architecture incorporating weather and travel information, including specific requirements for integration with legacy ATIS (or equivalent – see Figure 2);
- Technical requirements summarizing the desired types of information (e.g., traffic, transit, weather) as well as data management and data dissemination directions.

It should be emphasized that these are intended as guidelines for deployers and should not be interpreted as rigid system specifications. Local budgets, legacy systems, and operational preferences may result in local deployer variations from the letter of these guidelines. For this reason, the Functional Requirements should be considered deployment objectives rather than conditions of participation. It is expected that deployers will gradually make adjustments to local systems over time to bring them into line with the desired functionality (where applicable for that agency). Uniformity of quality of information, of presentation, and of user interface will reinforce the desired image of a single Canada 511 system and service. However, to encourage participation and to provide as wide coverage as possible, the Canada 511 Consortium will need to maintain a flexible approach.

It should noted that a limitation of the Functional Requirements is that they represent only the travel component of the Canada 511 system and do not reflect the needs of stakeholders using the weather-related services of the system.

Figure 2: Typical Canada 511 Architecture



Data Sources
Internet
Transit, Tourism Data, etc.
External Agencies
System Portal
Arterial Signal Control
Freeway ATMS
Website
Environment Canada 511 Infrastructure
Environment Canada Systems
Voice Application Server / Voice Portal
PBX
Telephone
Telephone
Telephone
Telephone
Secure Communications Network
Local 511 Infrastructure
System Operators (e.g. 511, ATMS, Dispatch)
511 Server
Data Fusion
Voice Application Server / Voice Portal
PBX
Telephone
Telephone
Telephone
Telephone

Proposed Deployment Standards and Guidelines

As with the preliminary Functional Requirements, the Proposed Canada 511 Deployment Standards and Guidelines were developed to guide content, system and process consistency amongst the local traveller information system deployments within the Canada 511 network. This type of guideline was considered necessary, as the deployment concept for traveller information within Canada 511 is a ground-up development scheme – meaning that local agencies are responsible for deployment. This distributed responsibility will allow for local autonomy in terms of system architecture, but there is a risk that without deployment standards, the overall system may suffer from a lack of consistency from site to site. These Canada 511 Deployment Standards and Guidelines seek to provide the guidance necessary to achieve this consistency.

While a significant level of detail and content is presented within the Guidelines, it should be noted that many Development Plan tasks, and the Functional Requirements in particular, must be completed before these Guidelines can be finalized.

4. RECOMMENDATIONS

Canada 511 Development Plan

The skilful management of the Canada 511 Development Plan will be key to the success of the system itself. To further the objectives of the Canada 511 service, there is a need to continuously update this Development Plan to ensure that it always reflects the current status, that project needs are identified, that new tasks included as they are identified, and that all tasks are adequately resourced.

There is also a need to closely monitor the developments in 511 deployment in the United States. This will allow Canada 511 deployers to leverage the lessons learned in the U.S. and to encourage a development program that will ensure compatibility between the two systems in the future.

To support the continuation of the Canada 511 Development Plan process, there is a need to establish a permanent body to oversee the deployment activities associated with Canada 511. The structure and mandate of the existing Canada 511 Consortium will expire with the successful completion of the CRTC licensing application to set aside the 511 number. Funding and resources have not been identified for the remaining Development Plan tasks (i.e., those not completed as part of this project). Appropriate resources must be assigned to these tasks (both funding and personnel), and to support the ongoing deployment of Canada 511 across the country. It will also be necessary to establish some framework of institutional support for the program. Ideally, because of their involvement in the current CRTC application and in the 511 Readiness in Canada project, the existing Consortium members would assume this role.

In addition, there is a need to more fully scope the tasks within the Development Plan to include any activities of Canada 511 Consortium members. For example, Environment Canada is active in its preparations for Canada 511 and its internal activities include design processes, stakeholder analysis, functional requirements related to weather data, and resolution of potential design conflicts with the transportation side. Another example is the significant effort involved in the application to the CRTC. At present time, neither of these activity centres is adequately captured within the Canada 511 Development Plan. Further coordination between the task leaders and the central project management will be necessary to resolve this shortcoming.

Also, at the close of this project, there are avenues of investigation that may be incorporated into the Development Plan:

- There is a need to identify mechanisms for funding local deployments of Canada 511 to ensure sustainability.
- The Canada 511 Consortium currently comprises representatives from each of the provinces, the Yukon Territory, and a number of non-governmental agencies representing the transit industry and other technical associations. The Canada 511 Consortium should consider extending an invitation to participate to tourism, trucking/logistics and economic development stakeholders.
- Local agencies should conduct deployment planning activities before proceeding with a Canada 511 deployment. Specifically, the identification of stakeholder needs and the related system implications should be assessed as part of the local deployment activities.
- There is a need to develop effective business plans that support local administrative and financing structures.
- These same local agencies can also help by supporting the 511 Consortium that will be carrying certain umbrella activities forward, such as the functional requirements definition and the deployment guidelines.
- For each region considering deployment, there is a need to identify the logical local coordinating body or lead agency that will act as the local Canada 511 host. This is likely the agency with the most supportive infrastructure and greatest stake in ensuring the satisfactory delivery of traveller information.
- Additional resources should be provided to help local deployers identify appropriate mechanisms for sharing data with participating agencies.
- Environment Canada has investigated the telephony issues surrounding this service delivery. Many of the issues investigated remain unresolved. Further investigations concerning the preferred approach to the deployment-related telephony issues must be undertaken. Substantial discussions with the telephony industry must be initiated.

Literature Review

Agencies considering the deployment of a Canada 511 service, and particularly those with limited ATIS experience, should carefully review the outcomes of this Literature Review to better understand the planning, operations and maintenance issues related to ATIS and Canada 511.

Stakeholder Needs Survey

The Participants List for the Preliminary Stakeholder Needs Survey represents key contacts within the Canadian organizations most likely to deploy a 511 system. These contacts may be of use to the Canada 511 Consortium in establishing local representation on the 511C.

The project website should be expanded to include:

- the results of the Stakeholder Needs Survey;
- a current membership list for the Consortium, including contact information;
- links to copies of each of the project deliverables;
- an updated Deployment Plan schedule that is frequently updated; and
- "What's New" page that highlights the current status of various ongoing tasks (e.g., the status of the CRTC application).

As the Canada 511 Consortium grows, there may be merit in a further round of survey questions to:

- refine the level of detail of the answers previously provided;
- include those new member agencies that have not yet indicated their needs;
- ask for specific, and more detailed questions concerning intentions, existing systems, and anticipated barriers to implementation; and
- include the telecommunications industry.

Functional Requirement

As with the Development Plan, the draft Functional Requirements are in need of a thorough review by the newly expanded Canada 511 Consortium. All new members should review the document to ensure that it adequately reflects their local deployment needs.

Further investigation is required concerning the following technical aspects of the Canada 511 system:

- impacts on existing systems and potential migration paths to Canada 511 (e.g., are there interim steps that would allow an incremental approach to deployment?);
- form and function of the greeting system described in Section 2 of Appendix D;
- issues facing operators of legacy (or existing) systems (if any);
- financing issues and the Business Model for Canada 511; and
- development of a model user interface.

Proposed Deployment Standards and Guidelines

As noted above, a number of Development Plan tasks must be completed before the Guidelines can be finalized. In the short term, the Guidelines will be subject to a comprehensive review by the members of the Canada 511 Consortium. In addition, should a permanent body be established to provide oversight for the Development Plan program, it should periodically review the Guidelines to ensure that they reflect the current deployment vision.

Lastly, Consortium members should be encouraged to share their deployment experiences with the Consortium to periodically refine and improve these guidelines.

Appendix A

Canada 511 Development Plan (June 2004)

511 READINESS IN CANADA

INNOVATION THROUGH PARTNERSHIP INTELLIGENT TRANSPORTATION SYSTEMS RESEARCH & DEVELOPMENT PLAN FOR CANADA

TASK 1.3 - CANADA 511 DEVELOPMENT PLAN (VER 0.1)

JUNE 2004

University of Waterloo

IBI Group
in cooperation with
The University of Waterloo

IBI GROUP

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1. INTRODUCTION

1.1 Background

The current report has been prepared as part of the First Milestone Deliverable for the 511 Readiness in Canada Project, prepared for Transport Canada as part of its 'Innovation Through Partnership - Intelligent Transportation Systems Research & Development Plan For Canada' programme, which includes:

- Task 1.1 – Project Initiation Meeting (held January 22, 2004);
- Task 1.2 - Work Plan & Methodology (submitted February 14, 2004, and amended per the Meeting Minutes of February 19, 2004); and
- Task 1.3 – A draft Canada 511 Development Plan.

The intent of the draft Canada 511 Development Plan (the 'Development Plan') is to create a framework that includes all the anticipated work tasks required to establish a national 511 weather and traveller information service for Canada. This draft Development Plan includes a description of each required task, and the associated anticipated schedule and schedule dependencies, necessary to complete all the planning, consultation, negotiation and deployment tasks for the system.

The current report is the first working draft of this Development Plan. It is anticipated that the Canada 511 Development Consortium will build upon this draft Development Plan as the system development work moves forward. In effect, this will be a 'living document', under continual update.

1.2 Definitions

The following definitions are provided for reference within this document.

The Canada 511 System	A reference to the broad network of system infrastructure and operational processes facilitating data collection, fusion, and dissemination that will collectively be known as Canada 511.
Implementers	Any federal, provincial, or local agency responsible for the commissioning of an information service that will form part of the Canada 511 system.
The Canada 511 Service	A reference to the broad scope of services and products to be supplied by the various implementers participating in the Canada 511 system.
The 511 Development Consortium, or 'the Consortium'	A working group of parties co-funding development activities that support the development of the 511 system. The Consortium is comprised of ITS Canada, Ministere des Transports Quebec, the Ministry of Transportation for Ontario, CUTA, Environment Canada and Transport Canada.

1.3 The Canada 511 'Vision'

The Canada 511 system will provide users with 3-digit dialling access to information on road and weather conditions nationwide. The system will contain both 'static' (non-changing, or infrequently changing information) and 'real-time' information (automatically and continuously updated information) concerning weather and travel conditions.

The 'weather component' will provide an array of weather-related services. In addition to weather conditions affecting road surface conditions, the weather component will provide information serving marine, agricultural, aviation, and other stakeholders and clients. The travel conditions component will deal with natural occurrences affecting the movement of people along road sections. This will necessarily overlap with the 'traveller component' of the system.

The traveller component will provide congestion, road and lane closures related to construction, special events, or traffic jams that cause delays for businesses and the general public, as well as information about schedules and the status of transit buses, ferries, light rail, and other public transportation in local communities.

The Canada 511 system will principally employ a telephone interface to provide this information to its clients. This will provide the widest possible access to the information, both pre-trip and en-route. However, a complementary 511 website is part of this 'Vision', providing additional access to the same information that is enhanced using visual media.

Environment Canada has been working towards a National Weather service for the past several years, and has in place existing systems that currently handle a high call volume for a variety of users (aviation, marine, agricultural, travel, etc.). Environment Canada is interested in moving to a uniform three-digit access number to facilitate its operational objectives and provide simplified user access to its information services. In the process, Environment Canada is looking to upgrade its related information infrastructure and improve the quality and breadth of services provided to its current customers.

Environment Canada is in a more advanced state of '511 readiness', and will be prepared to 'go live' with its 511 information services well in advance of the real-time information being available for road applications.

While Environment Canada stakeholders would benefit from an early roll-out of 511 based primarily on weather information, there is a risk that the system will be perceived as an exclusively weather-related service upon subsequent addition of traveller information. To address this concern, it is envisioned that the Canada 511 service be deployed in two broad stages:

(i) Upon initial delivery of the Canada 511 service, it will provide primarily weather-related information encompassing the range of services that Environment Canada deems desirable as part of its initial deployment. This deployment would be nationally-based, providing local, regional and national weather information for all areas of the country. This stage would also see the introduction of generally higher-level 'static' (i.e. non-real time) information on traveller services provided by the federal and provincial levels of government. This may include information on the Trans-Canada Highway System, ferries schedules and status, border crossing information, CVO information, and provincial driving regulations, licence and vehicle registration information, etc; and

(ii) The second stage is characterized as an on-going period (versus a milestone roll-out) wherein multi-modal traveller information would be included on the system as it becomes available locally. This information may include, for example, additional static information at the local level (city, provincial, etc.), and real-time information for provincial and local roads, and for transit properties, as it becomes available.

1.4 Role of the Canada 511 Development Consortium

In the United States, a '511 Deployment Coalition' has been working for the past several years to support the deployment of 511nationally. The coalition is made up of senior representatives of Federal and State governments, national transit advocates and private sector representatives within the industry. The role of the 511 Deployment Coalition is to support the on-going deployment of 511 systems by local and state implementers by providing a federal lobby and supplying local implementers with the marketing tools and deployment standards and guidelines necessary to deploy a system. By gradually stitching together various 511 systems developed at the State, regional and municipal levels, all developed under the same deployment guidelines, a cohesive and uniform national system is emerging.

A similar effort is now underway in Canada. For a number of years, ITS Canada has been monitoring the developments in the United States and laying the groundwork for a Canadian 511 Development Consortium ('the Consortium'). The Consortium was struck in the Fall of 2003, and is comprised of ITS Canada, Transport Canada, Environment Canada, CUTA, and the provincial ministries responsible for transportation from Ontario and Quebec. The Consortium's early focus has been to secure the use of the 511 telephone number through an application to the federal licensing body, the CRTC.

However, the mandate of the Consortium is broader than the noted CRTC application. The Consortium is to carry forward an overall 'Canada 511 Development Plan' (the 'Development Plan') that would set the earlier efforts of ITS Canada into the larger context of the planning, consultation, negotiation and deployment tasks necessary to realize a nationwide Canada 511 system.

1.5 Scope & Objectives

The objectives of the Canada 511 Development Consortium are to:

- Facilitate implementation of the Canada 511 system;
- Promote consistency amongst deployments; and
- Encourage standards in the deployed level of user services, data quality, and data availability.

The technical objectives of this Canada 511 Development Plan are to:

- Define stakeholder needs and develop functional requirements leading to 'Content & Consistency' guidelines. It is assumed that the Environment Canada stakeholder needs are already well understood, and that this effort will focus primarily upon road users;
- Assess the legislative and regulatory issues facing the implementation of a Canada 511 system. This will include matters of privacy, partnering and ownership of intellectual property rights;
- Develop an 'Operational Framework' for the benefit of 511 implementers, providing direction in terms of the Canadian ITS Architecture, negotiations with the telecommunications industry, partnering, and the collection, fusion and dissemination of data and information;

- Develop an 'Institutional Framework' for the benefit of 511 implementers, providing direction in terms of management and institutional support, potential directions in business models, and funding strategies supporting an on-going 511 system operation; and
- Develop 'Deployment Process & Content Consistency Guidelines' to assist 511 implementers in the deployment of their systems.

The administrative objectives of this Canada 511 Development Plan are to:

- Identify all the tasks associated with the above-noted technical objectives; and
- Identify a tentative schedule to complete these tasks.

This report focuses primarily on the technical aspects of the development effort, and does not discuss the internal business processes of the Consortium. Consequently, the draft Canada 511 Development Plan does not address the following matters:

- The assignment of roles and task responsibilities to members of the Consortium (and potentially others);
- The assignment of funding responsibilities for the conduct of the various Development Plan tasks;
- The individual roles of the 511 Deployment Consortium (511C) members;
- Reporting structures within the Consortium;
- Resource management;
- Composition of task teams; and
- Internal progress meetings, reporting relationships, external reporting linkages, etc.

While this first draft (Ver. 0.1) of the Development Plan does not include any allocations of Consortium resources, it identifies approximate desirable time frames to complete each task. Subsequent discussion amongst the Consortium members will be necessary to assess the reasonableness of these time frames within the context of the Consortium membership's available resources.

2. THE DEVELOPMENT PLAN

Task 1 - Literature Review & Industry Assessment

Objective:

To produce a literature review identifying the benefits, costs, and lessons learned associated with the deployment of current state-of-the-art telephone-based ATIS in North America and selected locations overseas.

Approach:

The Literature Review will focus on the benefits, costs and lessons learned in state-of-the-art telephone-based ATIS applications. The Review will take advantage of the considerable amount of material published on the 511 experience in the United States, but will include the Canadian experience in municipal, regional and Provincial traveller information telephone services.

The importance of the work already completed in the United States cannot be over-stated. The U.S. 511 Deployment Coalition has been very active over the past several years directing and supporting the deployment of 511nationally. The Coalition has produced or supported an enormous amount of deployment guideline materials that, for the most part, are directly relevant to the Canadian effort. Accordingly, it is anticipated that these materials will be fundamental to this state-of-the-art assessment.

It is anticipated that the identified benefits will include safety and network efficiency for mixed traffic, and travel time reliability and improved ridership for transit operations. Demonstrable benefits, both quantitative and qualitative, will support the CRTC application.

It is hoped that the Literature Review will provide insight to the costs of deployment, and means of funding telephone-based ATIS systems. However, it is anticipated that much of the information available will be derived from the American experience with deploying the U.S. 511 system where the institutional, operating and funding environments may not be comparable to circumstances in Canada.

Lastly, the Literature Review documentation will provide an overview of the 'lessons learned' in the industry, and this will support the on-going development and refinement of the Canada 511 Development Plan itself.

Resource Assignment:

This task has been assigned to IBI Group as part of its current contract to Transport Canada under its "Innovation Through Partnership - Intelligent Transportation Systems Research & Development Plan For Canada" program.

In addition to the publicly available information, IBI Group will include the following items within its Literature Review:

- The Canadian telephone-based ATIS systems identified through a recent survey conducted by IBI Group; and
- The results of IBI Group's recent literature review conducted for the SW Washington State Regional Transportation Council.

Schedule & Dependencies:

As part of the IBI Group assignment under contract to Transport Canada, this task is scheduled for completion within ten (10) weeks of the Project Initiation, and is to be submitted to Transport Canada on March 26, 2004.

This task is not dependent on the completion of any previous task. This task will act as input to Task 2.2 (Functional Requirements), Task 3.1 (the CRTC Application), Task 4 (the Technical Framework), Task 5 (the Institutional Framework) and Task 6 (the Deployment Process and Content Consistency Guidelines).

Task 2 – Functional Requirements

The Canada 511 system has the potential to provide a wide variety of information and services to a broad group of stakeholders. To bring clarity to the desirable information and services that are to be provided, the Consortium will need to investigate stakeholder needs with a view to developing functional requirements. It is assumed that the Environment Canada stakeholder needs are already well understood, and that this effort will focus primarily upon road users. To accomplish this goal, the following tasks are proposed:

TASK 2.1 - CONDUCT PRELIMINARY USER NEEDS SURVEY

Objective:

A preliminary set of stakeholder (e.g. operator, user, data providers, disseminator, etc.) needs will be identified through the conduct of a survey of Canadian 'early ATIS implementers'. This preliminary input will support the development of draft Functional Requirements that will, in turn, be used to solicit broader stakeholder input.

Approach:

A web survey will be developed to solicit input on 'user needs' from a small sample of key public and private sector stakeholders. To foster support for the survey and encourage a successful 'survey return rate', the selected stakeholders should be drawn from a group of professionals that have close working relationships with the members of the Consortium. It is anticipated that the members of the Consortium will need to act as champions within their organizations to solicit these inputs internally. Stakeholders that are external to the members of the Consortium should include a cross-section of public user, public sector, and private sector stakeholders that can be categorized into 'supply' or 'demand' stakeholder groups. Some examples of these are as follows:

Supply Stakeholder	Demand Stakeholder
Government transportation agencies	Commuters (all modes)
Emergency services	Tourists and tourism agencies
Tourists and tourism agencies	Commercial vehicle operators
Potential data suppliers	Information Service Providers (e.g. media, service and product vendors)

Environment Canada is currently considering a user survey or focus group to solicit inputs regarding content and interface. This 'demand stakeholder' (or 'consumer') survey will investigate the opinions of the public to determine what components of the weather portion of the 511 service would be of value to them. Consequently, the web survey will focus on the needs of the other 'demand' and 'supply stakeholders'.

The survey will be designed to be easy to use and take relatively little time to complete. It will also make maximum use of radio buttons to reduce the likelihood of any ambiguity in the responses.

Stakeholders will be solicited for input on the following topics:

- What services does the stakeholder require?
- What services or products do their customers require?
- What expectations do they have of a national 511 system?

- What legislative processes do they need resolved (e.g. legal issues, institutional support, funding, etc.)?
- What technical challenges do they face in implementation (e.g. ATIS data availability, system management and architecture, telecommunication provider issues, etc.)?

Similar exercises for 511 deployments in the U.S. Pacific Northwest identified that in addition to freeway traffic information, common stakeholder needs include the following:

- Arterial traffic conditions data (preferably real-time);
- Real-time and static multimodal information for transit, airport, rail and ferries;
- Parking data on status, location and availability;
- Reliability and timeliness of data (including time stamps, duration and location information);
- Specifications for quality and accuracy of data to be shared amongst agencies generating and sharing data;
- The development of common data formats; and
- A centralized "hub" for multi-jurisdictional ATIS data.

Potential respondents will be directed to a project website providing information on the background to the project, interim deliverables, and additional information intended to generate ideas concerning stakeholder needs.

It should be stressed that this round of stakeholder input is to derive an early picture of user needs leading to fairly high-level functional requirements documentation. These functional requirements will be vetted through a subsequent stakeholder consultation process.

Resource Assignment:

This task has been assigned to IBI Group as part of its current contract to Transport Canada under its "Innovation Through Partnership - Intelligent Transportation Systems Research & Development Plan For Canada" program. IBI Group's subconsultant, the University of Waterloo, will develop and maintain the project website, and develop and conduct the stakeholder survey.

Schedule & Dependencies:

As part of the IBI Group assignment under contract to Transport Canada, this task is scheduled over approximately two (2) calendar months, with anticipated completion in the second week of June 2004.

This task is dependent on the completion of Task 1. This task will act as input to Task 2.2 (Functional Requirements), and Task 2.3 (Stakeholder Consultation).

TASK 2.2 – DEVELOP PRELIMINARY FUNCTIONAL REQUIREMENTS

Objective:

To define a preliminary list of functional requirements for the Canada 511 system. This will establish, in more detail, the kinds of products and service will be provided through the Canada 511 service. It is assumed that Environment Canada will have already defined its functional requirements, and that additional functionality desirable at the local implementation level must be developed by the implementer.

Approach:

Based on the preliminary inputs obtained through the user survey in the previous task, a set of functional requirements will be developed. As the Consortium itself will not be an implementer, these functional requirements will serve two purposes:

- To define the objectives of the Canada 511 system to foster a uniform application amongst implementers; and
- To provide implementers with guidelines on a standard system configuration that would meet the intended operating and system objectives of the Canada 511 system.

Without getting into a design-level of detail, these requirements may include provisions concerning:

- Information Content, including:
    - Multi-modal information;
    - Transit information; and
    - Weather information/tools not already provided by Environment Canada.
- System environment, including:
    - System configuration;
    - Operating systems;
    - System security; and
    - System back-up/fail-over/restart;
- Data Requirements, including:
    - Database configuration and interfaces;
    - Data Storage;
    - Data exchange standards (e.g. XML); and
    - Data dictionaries.
- User interface configurations, including:
    - The telephone interface;
    - The web interface;
    - Services for the disabled community; and
    - Multilingual services.
- Communications requirements, including:
    - Systems capacities and performance; and
    - Call transfers.

Resource Assignment:

This task has been assigned to IBI Group as part of its current contract to Transport Canada under its "Innovation Through Partnership - Intelligent Transportation Systems Research & Development Plan For Canada" program.

Schedule & Dependencies:

As part of the IBI Group assignment under contract to Transport Canada, this task is scheduled over approximately three (3) calendar months, with anticipated completion in the last week of July 2004.

This task is dependent on the completion of Task 1, and will take inputs from Task 2.2 (Functional Requirements) as they become available. This task will act as input to Task 2.3 (Stakeholder Consultation), and Task 4.2 (High-level Canada 511 Design).

TASK 2.3 – STAKEHOLDER CONSULTATION

Objective:

To solicit input on draft functional requirements for the Canada 511 system from a broad selection of system stakeholders. Feedback from this process will allow the Consortium to finalize the objectives and functional requirements of the Canada 511 service.

Approach:

The draft functional requirements for the Canada 511 system will provide an important starting point for this broader solicitation of opinions from stakeholders. It will provide a description of the service objectives that has sufficient detail to explain the expected operation and generate discussion concerning the anticipated role of each stakeholder.

To accomplish this objective, the Consortium will convene a series of stakeholder workshops with the objective to:

- Explain the background and objectives of the Canada 511 service;
- Obtain a broader understanding of stakeholder needs;
- Present, solicit input on, and update the draft Functional Requirements based on this broader understanding of the stakeholder needs; and
- Potentially derive user attitudes towards payment for information (either basic or premium / personalized services).

The number and geographic diversity of these workshops, and the breadth of stakeholder representation, should be sufficient to ensure that adequate consideration has been given to:

- Regional needs (e.g. border issues, ferry services, rural issues, urban issues, the North, etc.);
- Disabled community and multi-lingual issues;
- The potential range of transportation stakeholder needs (e.g. transit, para-transit, freeway operations, arterial operations, etc.);
- The potential range of weather stakeholder needs (e.g. there may be needed tools that Environment Canada has not yet considered); and
- A reasonably broad (if not complete) representation from each of the provinces and territories.

The inputs from these workshops will be summarized and used to update and ultimately finalize the Functional Requirements for Canada 511 document.

Resource Assignment:

This Task is still to be assigned by the Consortium.

Schedule & Dependencies:

This task is scheduled over approximately four (4) and a half calendar months, with anticipated completion in the last week of January 2005.

This task is dependent on the completion of Task 2.2 (Functional Requirements). This task will act as input to Task 4.2 (High-level Canada 511 Design).

Task 3 - Regulatory and Legal Requirements

TASK 3.1 – APPLICATION TO THE CRTC

Objective:

The objective of this task is to secure from the CRTC the dedicated use of the 511 number for a Canadian traveller and weather information service.

The following information is based on the Rothchild & Co work plans provided by Tony Chir of Environment Canada.

Approach:

Task 3.1.1 - Preparation of the Application

A formal application to the CRTC is required to request the dedicated use of the 511 number for the stated purpose. The Consortium (and specifically Environment Canada) has already given its notice to the CRTC that it is going to submit an application. Once received, the CRTC will consider the application's merits in terms of the benefits to the public, and the long-term financial and operational sustainability of the proposed system.

The application will describe the objectives, high-level operations, approximate timelines for service provision, anticipated costs, and potential funding mechanisms / business models for the 511 service. It will identify the types of agencies that will implement 511 services, and demonstrate their commitment to the process through letters of support.

It is necessary that the Application make a strong case that there is a clear and immediate need for the service, and that to not proceed with the granting of the 511 number would jeopardize the potential future operation of the system, and coordination opportunities with the American 511 system.

The application will provide a rationale for the assignment of 511. Specifically, it will identify:

- The public benefits of three (versus ten) digit dialling;
- The difficulty in accommodating a seamless weather and traveller information service without a number that is ubiquitous both domestically, and across the border; and
- Overall, the application must demonstrate that the assignment of the 511 number for this purpose is in the best interest of the public.

Task 3.1.2 – Support the CRTC Review Process

Once submitted to the CRTC, the application file will be assigned to a Review Committee (or equivalent) that will review the application over a two to three month period. The committee will then be advancing clarification questions concerning the application. These questions typically must be answered within 10 business days of receipt. It is anticipated that there may be multiple iterations of such review questions.

Task 3.1.3 - Solicitation of Support for the Application

Letters of support from high-profile stakeholders will constitute a key element supporting the application. It will be necessary to solicit this support from as broad a base of stakeholders as possible (e.g. various travel modes, data supplies, data disseminators, public and private sector agencies, etc.).

A database of potential supporters will be developed and passed by the Consortium for its approval. The Consortium will approve and supplement this list, as appropriate, to ensure that all key stakeholders (including the ministers responsible for transportation from each of the provinces and territories) are given an opportunity to participate and are included in the solicitation.

A primer, or executive-level information kit on the Canada 511 Weather and Traveller Information System will be prepared to bring potential supporting stakeholders up-to-speed on the goals and objectives of the system. Letters soliciting support, with the accompanying information kit, will be drafted and forwarded to the Consortium for its approval.

Once all materials are approved, the stakeholders identified in the 'supporters database' will be contacted directly by telephone to introduce the topic, provide background, and solicit their support. If successful, or if further information is required, the above-noted correspondence and package of information will be forwarded.

The Council of Deputy Ministers is scheduled to meet at this April's TAC conference. The public agency representatives on the Consortium will speak to their Deputy Ministers to get a 511 information report on the agenda for the conference.

Further communication with an extended group on interested parties (e.g. MPs, mayors, FCM, press, NGOs, etc.) may also be desirable to explain the need for the service, and to solicit support for the application.

Once engaged, these stakeholders will be kept up-to-date on the progress of the application and called upon (as needed) to provide added support.

Task 3.1.4 - Drafting of Replies to Interventions Opposing Application

Through the course of the application process, third parties may file interventions with the CRTC in opposition to the application. It will be necessary for the Consortium to address the concerns and provide a formal response to each intervention. Two parties in particular may register interventions:

- The hearing impaired community may oppose the re-assignment of the 511 number; and
- Private sector players (e.g. Pelmorex) may oppose the introduction of expanded competition in the provision of weather services.

Task 3.1.5 – Public Consultation

It has been determined that there is no need for the Consortium to appear before a CRTC public hearing in support of its application. It is expected that instead, some degree of public consultation will be needed to ensure that the application and subsequent review is conducted in an inclusive manner, and that the public will have an opportunity to field questions related to the application. The Consortium will be required to provide written responses to each registered question or negative intervention.

There will be a number of activities required to prepare for this public consultation:

- The drafting of anticipated questions and answers;
- The preparation of formal verbal and written responses (where necessary);
- The preparation of support materials such as PowerPoint presentations, other video aids, charts, etc; and
- The rehearsal of the anticipated Q&A process.

Resource Assignment:

Oversight of all aspects of the CRTC application process has been assigned to Rothchild & Co as part of its current contract to Environment Canada. As part of this assignment, Rothchild & Co will be defining the application strategy, co-ordinating the sub-consultants required to prepare application, and acting as the prime liaison with the CRTC.

Schedule & Dependencies:

The application to the CRTC (Task 3.1.1) will take four (4) months to prepare and is tentatively scheduled for submission in September 2004.

This task is dependent on the completion of Task 1. This task will act as input to Task 4.1 (Telecommunications Issues).

TASK 3.2 – PRIVACY ISSUES

Objective:

The objective of this task is to identify appropriate measures to protect the right to privacy of individuals while maintaining a reasonable level of access to traveller information for all public and private sector partners and clients.

Approach:

Industry direction suggests that the incorporation of appropriate system firewalls is necessary to protect the integrity and safeguarding the use of the ATIS data. This approach will be further investigated to provide implementers with a sense of the appropriate level of protection that should be afforded a traveller information system.

Secondly, it will be necessary to develop ‘freedom of information’ and ‘protection of privacy’ policies. To this end, ITS America has published a ‘ITS Fair Information and Privacy Principles’ report that provides guidelines for developing such a policy. In addition to these guidelines, there are many industry examples to reference in the development of a Canadian policy. Such policies often differentiate between the use of video images and non-video data. Three examples include:

- The Puget Sound Area Smart Trek Privacy Policy;
- California Department of Transportation (Caltrans) Operations Policy Concerning Access to Live CCTV;
- New York State Department of Transportation’s Draft CCTV Privacy Policy;

However, there are many more examples for the Consortium to review for guidance in this regard.

The intended product will be a set of Canadian policies for access to information and protection of privacy within ATIS.

Resource Assignment:

This Task is still to be assigned by the Consortium.

Schedule & Dependencies:

The development of these privacy policies will take approximately two (2) months to prepare and is tentatively scheduled for completion in the third week of March 2005.

This task is dependent on the completion of Task 4.2 (High-level Canada 511 Design), though it will take inputs from Task 2 (Functional Requirements). This task will act as input to Task 6 (Deployment Process and Content Consistency Guidelines).

TASK 3.3 - PARTNERING AGREEMENTS

Objective:

The objective of this task is to identify model traveller information data sharing agreements that may be used between 511 implementers and public and private sector partners and clients.

Approach:

There are two possible models for sharing data:

- Less formal agreements commonly struck between two entities with strong pre-existing working relationships or common reporting structures (e.g. two branches of the same government office). In instances of low risk, the effort associated with more formal agreements would not be justified; or
- A formal Memorandum of Understanding (MOU). MOUs are used to provide 511 implementers with the extra assurance that outside agencies will fulfill their technical and financial obligations.

Typical components of a MOU include:

- A description of the purpose, background and context of the agreement;
- A detailed account of the partners' 'roles and responsibilities';
- The specific guidelines to be followed;
- Any specific terms of the agreement related to agency privacy or data sharing policies;
- The identification of a common understanding of how the system shall evolve and develop over time - including the future involvement of additional parties; and
- The identification of a mutually acceptable conflict resolution process.

The intended product will be a Memorandum of Understanding template that may be used to strike agreements amongst implementers and public and private sector partners and clients.

Resource Assignment:

This Task is still to be assigned by the Consortium.

Schedule & Dependencies:

The development of the MOU template will take approximately two (2) months to prepare and is tentatively scheduled for completion in the third week of March 2005.

This task is dependent on the completion of Task 4.2 (High-level Canada 511 Design), though it will take inputs from Task 2 (Functional Requirements). This task will act as input to Task 6 (Deployment Process and Content Consistency Guidelines).

TASK 3.4 - OWNERSHIP RIGHTS

Objective:

The objective of this task is to identify model 'Terms of Use' agreements that may be used to protect the intellectual property rights and limit liability for 511 implementers.

Approach:

To protect their intellectual property, American 511 implementers have published restrictions of the use of their data, and disclaimers should anyone violate these restrictions. These documents have been developed in reaction to third party (typically private) agencies capturing public data for reformatting and remarketing under their own for-profit product label.

Typical components of a 'Terms of Use' agreement include:

- Any desirable restrictions on the use of the data. This is intended to regulate the re-publishing, display, redistribution or commercial exploitation of any of the content without the express written permission of the data source.
- Disclaimers of warranty and statements aimed at limiting liability; and
- Indemnification (e.g. If the copyright owner is involved in litigation as a result of a third party use of a website site, the third party must agree to pay the costs associated with defending the copyright owner).

The need to establish 'Terms of Use' agreements will most commonly be an issue where software development is necessary within the data fusion task for a private sector service provider.

The intended product will be a 'Terms of Use' agreement template that may be used to strike agreements amongst implementers and public and private sector partners and clients. The Terms of Use for Puget Sound Traffic Internet Site provides excellent guidance in this regard.

Resource Assignment:

This Task is still to be assigned by the Consortium.

Schedule & Dependencies:

The development of this 'Terms of Use' agreement template will take two (2) months to prepare and is tentatively scheduled for completion in the third week of March 2005.

This task is dependent on the completion of Task 4.2 (High-level Canada 511 Design), though it will take inputs from Task 2 (Functional Requirements). This task will act as input to Task 6 (Deployment Process and Content Consistency Guidelines).

Task 4 – Design System & Operational Framework

TASK 4.1 – TELECOMMUNICATIONS ISSUES

Objective:

The objective of this task is to identify and resolve the technical and business model issues associated with the involvement of the telecommunications industry.

Approach:

Task 4.1.1 – Identification of Telecommunications Industry Representatives

The successful deployment of a Canada 511 system across the nation will depend upon the cooperation and participation of many telecommunications carriers. The experience from the U.S. 511 system deployment is that coordination with these agencies can be a lengthy process, and appropriate amount of time will be scheduled to accommodate this matter. Engaging the Canadian telecommunications industry early in the Canada 511 system development process will also be necessary.

In addition to the benefits to the schedule, the early and on-going participation of the telecommunications industry will keep these key stakeholders informed, and they may be able to provide valuable inputs regarding procedural and technical requirements.

There are three important types of telecommunications stakeholders negotiations to pursue in the development of the 511 system; landline, wireless, payphone carriers. These agencies must eventually be contacted for each jurisdiction planning to deploy a 511 system. Ideally, these contacts would be made through an overseeing technical telecommunications association. There is no one association that may speak for each of the telecommunication carriers noted above. For the U.S. 511 deployments where no coordinating agency was available, some successful deployments fostered the cooperation of the largest carriers first, which acted as a model for discussion with other carriers.

Another successful strategy was to engage the expertise of a telecommunications expert who could:

- Advise on the identification of appropriate early contacts in the telecommunications industry;
- Coordinate and negotiate with carriers regarding call routing and other matters concerning their involvement in the 511 system; and
- Provide input to the design of the system.

If considered desirable by the Consortium, this telecommunications expertise should be sought as early as possible in the process.

Task 4.1.2 – Explore Telecommunications Industry Stakeholder Issues

The American experience with the telecommunications community's approach to participation in the 511 system has been adversarial. The carriers have concerns regarding the process and the technical and financial details of deployment.

A preliminary list of the issues to be resolved include:

- The identification of a preferred (or set of preferred) technical solution(s) to address call routing to the Canada 511 system (particularly across jurisdictional boundaries);

- The identification and funding assignment for any fixed (development or capital) costs associated with the implementation of Canada 511;
- The identification and funding assignment for any operational and maintenance costs associated with the on-going support of Canada 511;
- Any limitations on competition that may be imposed by the introduction of a 511 system; and
- The mechanisms and processes for call transfers from a local 511 system to (a) adjacent systems, (b) other N11 systems (if allowed), and (c) other information services (e.g. transit information).

From the Consortium's perspective, there is a need to get the telecommunications industry, as a whole and as individual carriers, to (a) commit resources to the development of the system, and (b) develop appropriate services to support the system. This may take some time but is a crucial element.

It is key to identify the cost of implementation with the telecommunication providers. This will permit budgeting and assignment of funding responsibilities. The American implementation experience suggests that primary stumbling blocks with the telecommunication industry were that it was not consulted appropriately, and there were expectations that it would take certain operations and maintenance funding responsibilities.

It should be noted that the big telecommunication carriers (e.g. Bell) will wish to develop a solution that suits all of its markets, and not just the local market currently developing a 511 system. This will also take time and may slow down system development.

Task 4.1.3 – Develop Canada 511 Telecommunications Model

As a follow-up to the previous discussions with the telecommunication carriers, a system model will be designed that will allow individual carriers and system implementers to better understand the telecommunications technical design that is being proposed.

The result of this task will be an appropriate technical white paper and accompanying drawings to describe the proposed design from (a) a technical telecommunications-level design level sufficient for implementation, and (b) and executive summary level that will permit high-level negotiators to discuss the pertinent issues prior to finalization of the intended technical design.

Task 4.1.4 - Management of Negotiations with Telecommunications Stakeholders

Finally, terms of an agreement will be negotiated with telecommunication carriers to participate in the system. Development, operational, maintenance and funding responsibilities will be outlined and approved by the parties to the agreement.

As such negotiations can be time consuming, ideally a telecommunication industry representative would be able to negotiate on the behalf of multiple carriers. If there is no such mechanism for negotiations, discussions with the largest landline, wireless and payphone carriers should be held first, which will act as models for discussion with other carriers.

Resource Assignment:

This Task is still to be assigned by the Consortium.

Schedule & Dependencies:

The development of this task will take approximately nine (9) months to complete and is tentatively scheduled for completion in the last week of June 2005.

This task is not dependent upon the completion of any other task. This task will act as precedent to Task 4.3.2 (Detailed System Design) for the Environment Canada design component of the overall system. It will also provide inputs to Task 4.2 (High-level Canada 511 Design), and Task 6 (Deployment Process and Content Consistency Guidelines).

TASK 4.2 – HIGH-LEVEL CANADA 511 DESIGN

Objective:

Set within the context of the 511 system architecture, this task will build upon the Functional Requirements defined in Task 3 to define the high-level design and functionality of the 511 system.

Approach:

A key component of the design effort will be to establish a system architecture that will reconcile the weather and traveller functionalities that will be brought together within this system. There are a number of considerations, including:

- The weather service systems are to be provided at a centralized location and by a single agency. The traveller information is to be provided via a decentralized network of systems, and by multiple agencies;
- The timing of the deployment is such that the weather service will be prepared to deploy with real-time information well in advance of any significant real-time traveller information. Environment Canada and/or its consultants have already completed some degree of design work. It will be necessary to coordinate with this effort to ensure there is no duplication of effort;
- The system must be expandable to allow for considerable growth as new traveller information providers enter the system;
- There is a need to identify the respective roles of the public and private sector in the collection, fusion and dissemination of the information; and
- If it is determined that there will be a service payment component, there will be an accompanying revenue management system requirement.

Throughout the development of a Canada 511 system architecture, particular care must be taken to ensure that the end result demonstrates conformity with the ITS Architecture for Canada and interoperability with the U.S. ITS Architecture and other adopted North American standards. It will relate most closely with the following Canadian ITS Architecture market packages: Broadcast Traveller Information (Canadian ITS Architecture Market Package ATIS 1) and Traffic Information Dissemination (Market Package ATMS 06). In addition, each of these market packages has a direct equivalency within the U.S. ITS Architecture, thereby providing conformity with that structure.

Using the 'lessons learned' and best practices identified in Task 1, the Consortium will build upon the Functional Requirements defined in Task 3 to further develop the design beyond the architecture. The design will touch on each of the following areas:

- Information Content, including:
    - Basic services (weather & traveller);
    - Optional services; and potentially
    - Premium services.
- System environment and requirements;
- System interfaces and interoperability, including:
    - Data sharing; and
    - Telecommunications design;
- User interface design, including:
    - The telephone interface (e.g. menu structure, use of IVR, etc.);
    - The web interface (e.g. layout, use of panes, map properties, navigation, etc.);
    - Interfaces for the disabled community;
    - Multilingual services;
- Data sharing agreements and protection of privacy policies; and
- The identification of evaluation metrics. Obtaining system performance (e.g. website hits, dial-in service call rates, etc.) and stakeholder feedback regarding the quality of service, and the degree to which stakeholder needs are being fulfilled is fundamental to achieving the goals of an ATIS. VAST should consider on-line surveys and periodic market research as part of its ATIS business practice.

The high-level design will provide implementers with common design and deployment guidelines (that are to be documented through Task 6, the 'Content & Consistency Guidelines'.

Resource Assignment:

This Task is still to be assigned by the Consortium.

Schedule & Dependencies:

The development of this design will take approximately four (4) months to prepare and is tentatively scheduled for completion in mid January 2005.

This task is dependent on the completion of Task 2.2 (Development of draft Functional Requirements) and the confirmation of intended direction by the Consortium at its September meeting. This task will act as input to Task 4.3 (Environment Canada Design), Task 5 (Design Institutional Framework) and Task 6 (Deployment Process and Content Consistency Guidelines).

TASK 4.3 – ENVIRONMENT CANADA DESIGN

Objective:

To design and ready for commissioning the 511 system in support of the initial weather-oriented Canada 511 deployment.

Approach:

Environment Canada is currently proceeding with this process. The following sub tasks are anticipated in support of the initial deployment:

- Task 4.3.1 - Contract with System Design
- Task 4.3.2 - Detailed System Design
- Task 4.3.3 - Procurement
- Task 4.3.4 - Installation
- Task 4.3.5 - Commissioning/Testing
- Task 4.3.6 – Documentation & Training

Further discussion with Environment Canada is necessary to further define these subtasks, define additional resources and support (where necessary), and confirm timelines.

Section 3 of this report provides an anticipated schedule for these activities.

Resource Assignment:

Oversight of all aspects of the system design have been assigned to Environment Canada who is currently working with systems consultants to prepare the necessary design.

Schedule & Dependencies:

It is assumed that the system design work necessary for the initial (weather-oriented) deployment, as described in Section 1.3 of this Plan, will take approximately one year to complete and is tentatively scheduled for completion on May of 2006.

This task is dependent on the completion of Task 4.2 (High-level Canada 511 Design). This task will act as input to Task 5 (Design Institutional Framework).

Task 5 - Design Institutional Framework

TASK 5.1 - IDENTIFICATION OF INSTITUTIONAL SUPPORT

Objective:

To identify the development, operations, and maintenance resources necessary to ensure that the Canada 511 system is operationally sustainable in the long-term.

Approach:

The Canada 511 system, as described in the 'Vision Statement' in Section 1.3 of this report, will be comprised of two distinct, but intimately connected components: the weather and traveller information services. The weather service has the benefit of one primary implementer. Environment Canada will have, from the start, support staff dedicated to (as examples):

- The coordination of stakeholder feedback and development of appropriate new services to meet stakeholder expectations;
- High-level, or coordinating discussions with telecommunications carriers;
- Deployment support in terms of operational, marketing and educational guidelines; and
- Authority for making high-level design modification decisions regarding the system.

The traveller service component will have a distributed network of implementers, deploying new 511 services over a wide geographic area, and over time. These individual implementers will have the benefit of the materials developed through the Canada 511 Development Plan, but generally will have varying levels of expertise in the development of such systems, and limited ability to coordinate global structural, procedural, or other changes to the system.

It will be necessary to identify an agency to:

- Address these issues for the traveller information component of the system;
- Coordinate services and system-related issues with Environment Canada; and
- Possibly act as a lead agency overseeing system development as a whole.

Resource Assignment:

This Task is still to be assigned by the Consortium.

Schedule & Dependencies:

The development of this design will take approximately three (3) months to prepare and is tentatively scheduled for completion in August 2006.

This task is only dependent on the completion of Task 4 (Design System and Operational Framework), but may started earlier than the completion of that task. This task will act as input to Task 5.2 (Assessment of the Business Model Options), and Task 5.3 (Identification of Funding Mechanisms).

TASK 5.2 - ASSESSMENT OF THE BUSINESS MODEL OPTIONS

Objective:

To establish working relationships and funding responsibilities amongst the various public and private agencies involved in the deployment of the Canada 511 system.

Approach:

It is rare that a public sector ATIS service provider accomplishes all aspects of data collection, data fusion, and information dissemination on its own, without the assistance of multiple external public and private agencies. There may be a considerable amount of work on the part of local implementers to establish these relationships. It will be necessary for Environment Canada, and the various participating traveller information providers to establish such relationships to ensure that their respective 511 deployments provide the desired services.

However, the industry wisdom of five years ago, as outlined in ITS America's '*Choosing the Route to Traveler Information Systems Deployment: Decision Factors for Creating Public-Private Business Plans – An Action Guide*' (1998) has now been modified, to reflect the fact that traveller information has not proven to be as profitable as first expected. Generally, these early business models presumed that there would be a strong market value for ATIS that would support a primarily private-sector enterprise. The private sector has noted that the provision of traveler information is not a profitable venture, but traffic information can be used to add value to 'bundled' services, thereby making the entire bundle more marketable (e.g. news, weather and traffic).

Various current FHWA sources now indicate that in order to provide at least the basic level of ATIS service, the public sector can expect to pay for most or all of the costs associated with an ATIS deployment. This direction is corroborated by the industry interviews conducted as part of the TransPort Business Plan for the Oregon Department of Transportation. Currently, in developing ATIS business models, all models require some degree of public funding (either seed money, or on-going funding stream). Therefore, the services provided by the private sector will be paid for, at least until such time as the market for traveller information matures.

Some considerations regarding private sector involvement in the system include:

- What role in data collection, fusion, and/or dissemination will be appropriate?
- What is the potential for a close relationship with local media outlets, possibly including reciprocal agreements for the sharing of data (including images, traffic reports, etc.)?
- What are the public agencies' expectations in terms of the level of free information that should be available to the traveling public and other users (e.g. commercial vehicle operations)? How will agreements with private information service providers limit the public agencies' abilities to provide free services?
- What is the potential to use advertising to generate revenue?
- What are the products that need to be delivered to potential customers (e.g. live incident alerts, congestion information, transit schedules, etc.)? What are the delivery systems (pre-trip and en-route) that best suit the information being conveyed? What are the potential emerging data dissemination technologies? What is the public sector's capacity to complete this work without private sector resources?
- What are the relative costs of delivering the data (e.g. costs to develop websites, text messaging, etc.), versus the costs associated with hiring a private sector ATIS contractor to perform this same function?

Agreements with public-sector partners need to be established to:

- Ensure clear delineation of responsibilities;
- Provide accurate and dependable real-time incident and event information;
- To fill-in the data gaps and provide broad data types (e.g. incidents, weather, freeway and arterial conditions & speed) from a number of public agencies with specialized inputs.

These operational agreements with public agencies should leave flexibility for the private partner to react quickly to changing market conditions.

The models selected should strive for low-cost, low-overhead operations that are automated as much as possible. This will counter the typically low revenue streams associated with traveller information.

Resource Assignment:

This Task is still to be assigned by the Consortium.

Schedule & Dependencies:

The development of this business model design will take approximately five (5) months to prepare and is tentatively scheduled for completion in October 2006.

This task is only dependent on the completion of Task 4 (Design System and Operational Framework), but may started earlier than the completion of that task. This task will act as input to Task 5.3 (Identification of Funding Mechanisms).

TASK 5.3 - IDENTIFICATION OF FUNDING MECHANISMS

Objective:

To establish the funding mechanisms for local deployments and on-going high-level system operations, development, and support.

Approach:

There will be a number of funding issues to be resolved to facilitate the continued deployment of the system across the country. These will include:

- How will the on-going high-level system operations, development, and support be funded?
- Can the telecommunications industry be compensated for their systems (capital) modification costs and operational costs, such as transfers from 511 to 911?
- Will there be any cost recovery strategies through partnerships (e.g. media advertising / sponsorship revenue)?
- While the costs associated with field Infrastructure, communications, central facilities, local operations, etc. for traveller information will typically be the responsibility of the local implementer, will there be funding incentives to encourage deployment?

These funding issues speak directly to the long-term sustainability of the Canada 511 system. Appropriate agreements need to be established to ensure the funding commitments established remain in force on a long-term basis.

Resource Assignment:

This Task is still to be assigned by the Consortium.

Schedule & Dependencies:

The development of these funding relationships will be a primary point of discussion within the previous task, and will be solidified under the current tasks. Consequently, it is anticipated that these discussions will take approximately one (1) month to complete and is tentatively scheduled for completion in November 2006.

This task is only dependent on the completion of Task 5.2 (Assessment of Business Model Options), but may be started before the end of that task.

Task 6 - Deployment Process & Content Consistency Guidelines

TASK 6.1 – DRAFT GUIDELINES

Objective:

To provide draft set of instructional documentation and guidance to the local 511 system implementers that will assist in deployments, provide for a uniform system and service approach across the country, and promote interoperability with the U.S. 511 system.

Approach:

A set of draft Content and Consistency Guidelines will be prepared that provide the necessary support to achieve these objectives. Most, if not all of the guidance planned within these document will be derived from the previous work tasks within the Development Plan.

The Content and Consistency Guidelines currently anticipated include:

- Implementation Guidelines For Canada 511
- Business Models For Canada 511
- Technology Guidelines For Canada 511
- Use Of Call Transfers In Canada 511
- System Interoperability For Canada 511
- Use Of Traffic Content For Canada 511
- Use Of Public Transportation Content For Canada 511 (providing information on transit issues, benefits, and potential applications)
- Use Of Weather Content For Canada 511
- Advocacy & Educational Materials for Canada 511 (providing information on marketing, public outreach, costs and benefits to make the case for developing local 511 systems)
- Evaluation Guidelines for Canada 511

One important aspect to cover, as it speaks directly to the issue of system interoperability, is the establishment of system technology standards, data sharing standards, and user interface standards. The number of technology types used, by a large number of cross-jurisdictional information systems, is such that these standards will be very important.

Resource Assignment:

The Content and Consistency Guidelines for the ‘Implementation Guidelines for Canada 511’ has been assigned to IBI Group as part of its current contract to Transport Canada under its “Innovation Through Partnership - Intelligent Transportation Systems Research & Development Plan For Canada” program.

Responsibility for the remaining Content and Consistency Guidelines are still to be assigned by the Consortium.

Schedule & Dependencies:

With the exception of the IBI Group assignment, the development of these Content and Consistency Guidelines will take approximately five (5) months to complete and is tentatively scheduled for completion in January 2006. However, the various Content and Consistency Guidelines may be drafted as the corresponding Development Plan task is completed.

TASK 6.2 – REVISION BASED ON STAKEHOLDER INPUTS

Objective:

To finalize the draft Content and Consistency Guidelines based on stakeholder inputs on the Regulatory and Legal Requirements and the draft documentation.

Approach:

As the various Content and Consistency Guidelines will be drafted as the corresponding Development Plan tasks are completed, there will be a need to update these Guidelines to reflect user needs, system design and institutional decisions.

An expanded project website will be used to disseminate these draft guidelines for further input, comment collection, and distribution of the final Content and Consistency Guidelines.

Resource Assignment:

This Content and Consistency Guidelines for 'Implementation Guidelines For Canada 511' has been assigned to IBI Group as part of its current contract to Transport Canada under its "Innovation Through Partnership - Intelligent Transportation Systems Research & Development Plan For Canada" program. The remaining Content and Consistency Guidelines have yet to be assigned by the Consortium.

Schedule & Dependencies:

With the exception of the IBI Group assignment, the development of these Content and Consistency Guidelines will take approximately five (5) months to complete and is tentatively scheduled for completion in January 2006. However, the various Content and Consistency Guidelines may be drafted as the corresponding Development Plan tasks are completed.

This task is dependent on the completion of Task 3 (Regulatory and Legal Requirements), its preceding tasks (e.g. the Functional Requirements), and Task 6.1 (Draft Guidelines) primarily, but will also be subject to additional stakeholder inputs. This task will act as one of the deliverables to the final deployment of the system (i.e. the actual implementation of the initial deployment).

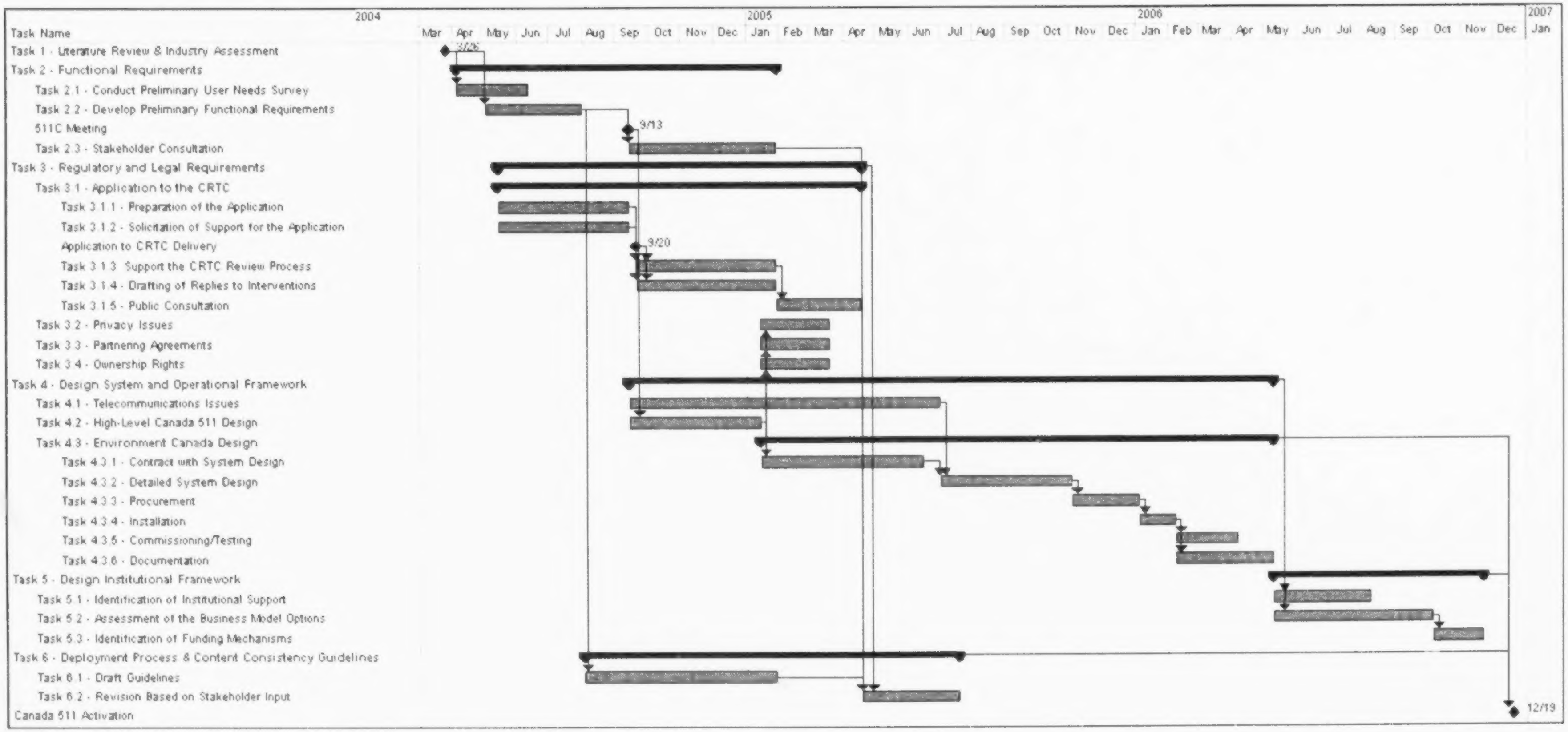
3. SCHEDULE

Figure A-1 provides an overview of the scheduled tasks identified through Section 2 of this report.

This schedule is considered a starting point for discussion. The task durations, required start and end times, dependencies, and anticipated milestones are all intended to generate discussion within the Consortium.

Despite the anticipated Canada 511 system activation date of December 2006, the task durations identified are considered generally aggressive. The design tasks (including the telecommunications industry negotiations) are anticipated to take much of this time to complete. These timelines are predicated on the ability of each member of the Consortium to assign appropriate resources, time and funds to complete the tasks in the time indicated.

Figure A-1: Canada 511 Development Plan Schedule



Appendix B

Canada 511 Literature Review and Industry Assessment
(June 2004)

511 READINESS IN CANADA

INNOVATION THROUGH PARTNERSHIP INTELLIGENT TRANSPORTATION SYSTEMS RESEARCH & DEVELOPMENT PLAN FOR CANADA

TASK 2.1 - LITERATURE REVIEW

JUNE 2004

IBI GROUP

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1. INTRODUCTION

1.1 Objectives

The current report has been prepared as the Second Milestone Deliverable for the 511 Readiness in Canada Project, prepared for Transport Canada as part of its 'Innovation Through Partnership - Intelligent Transportation Systems Research & Development Plan For Canada' programme.

The intent of the Literature Review is to derive three important pieces of information from the work already completed in industry. The Review will identify:

- The benefits of telephone-based Advanced Traveller Information Systems (ATIS) and of 511 in particular, to help support the Canadian Radio-Television and Telecommunications CRTC application for the dedication of the 511 number;
- The typical costs of installation to provide an understanding the magnitude of the financial commitment for implementers, and for those responsible for supporting the institutional infrastructure; and
- Industry 'lessons learned' that will be used to build a draft structure for the Canada 511 Development Plan (Task 1.3).

1.2 Report Structure

The remainder of this Literature Report is structured as follows:

Section 2 **ATIS & 511 Benefits**	A summary of the Literature Review findings concerning benefits of telephone-based ATIS services (including 511 systems) in the following categories: • Public Benefits • Public Agency Benefits Private Sector Benefits
Section 3 **ATIS & 511 Costs**	A summary of the Literature Review findings concerning the costs of implementing telephone-based ATIS services (including 511 systems).
Section 4 **Lessons Learned In 511 And Other Phone-Based ATIS Development**	A summary of the Literature Review findings concerning lessons learned in the deployment of telephone-based ATIS services (including 511 systems). The 'lessons learned' have been organized as follows: • System Planning • Regulatory and Legal Issues • Telecommunications Issues • Institutional Framework • U.S. Deployment Coalition Deployment Assistance Reports • Schedule for Deployment

Throughout the report, references to Literature Materials that are summarized in Appendix B1 are referenced in brackets, e.g. [5].

1.3 List of Acronyms

Acronym	Description
AAA	American Automobile Association
AIN	Advanced Intelligent Network
ARTIMIS	Advanced Regional Traffic Interactive Management & Information System
ATIS	Advanced Traveller Information Systems
CCTV	Closed Circuit Television
CO	Carbon Monoxide
CRTC	Canadian Radio-Television and Telecommunications Commission
DAR	Deployment Assistance Report
DMS	Dynamic Message Signs
DOT	Department of Transportation
EPA	Environmental Protection Agency (U.S.)
FCC	Federal Communications Commission (U.S.)
FHWA	Federal Highway Administration (U.S.)
IDAS	Federal Highway Administration ITS Deployment Analysis System
ISP	Information Service Provider
ITS	Intelligent Transportation Systems
IVN	In-vehicle navigation
IVR	Interactive Voice Response
MOU	Memorandum of Understanding
NOx	Nitrous Oxide
O&M	Operations & Maintenance
TIS	Traveller Information Systems
TV	Television
USDOT	United States Department of Transportation
VMS	Variable Message Sign
VXML	Voice Extensible Markup Language
XML	Extensible Markup Language

2. ATIS & 511 BENEFITS

Generally stakeholders who use traveller information fall into three broad categories: (a) the travelling public, (b) public sector agencies, and (c) the private sector.

2.1 Public Benefits

The general commuting public wants to know how their commute route is operating. This allows them to make decisions regarding departure time, route, and potentially mode of travel. This is particularly true where the commuter has route options. By obtaining reliable pre-trip and en-route information, road users may experience the following benefits:

2.1.1 SAFETY

Providing timely information allows travellers to make informed decisions concerning routes and allows them to avoid potentially unsafe conditions. This reduces the frequency of primary collisions in the vicinity of congestion, and secondary collisions in the vicinity of primary collisions.

Modelling of road networks in Cincinnati and Northern Kentucky estimated traveller information reduced fatalities by 3.2% [1]. A downtown Seattle study produced more modest results, indicating a reduction in fatal collisions by 0.6% [2].

Studies have also shown that even when route options are limited, knowing what lies ahead reduces stress for the motorist [3].

2.1.2 ARRIVAL TIME RELIABILITY

There are multiple studies that indicate ATIS provides significant benefits in terms of the reliability of reaching trip destinations on time. A Washington DC area study of 75,000 trips showed that users of ATIS data had only a 3% chance of arriving at their destination after their intended arrival time, while conservative non-ATIS users were late 8% of the time and aggressive non-ATIS users were late 19% of the time [4].

A separate study simulated trips on the Washington, DC network, and both ATIS users and ATIS non-users were on time approximately 99% of the time. However, drivers that used ATIS significantly reduced the amount of time spent on early arrivals. Using ATIS, unfamiliar drivers arrived at their destination within 15 minutes of the target arrival time 79% of the time. Without ATIS, unfamiliar drivers arrived within 15 minutes 42% of the time [5].

The Seattle study noted above under “Safety” demonstrated increased travel time reliability, as overall system delay was reduced by 1.5%, and travel time variation was reduced by 2.5%, in that city’s downtown area [2].

2.1.3 COST SAVINGS

Economic analysis of modelled conditions in the Washington D.C. area suggests that pre-trip departure notification can reduce early/late arrivals, as noted above, but also save 40% of users $60 or more each year in lost time [1].

These cost benefits associated with time savings are of particular value to Commercial Vehicle Operations whose customers rely on the timely delivery of goods and services. The same may also be said of inter-city coach transportation.

2.1.4 TRAVEL CHOICES

Detailed traveller information that indicates specific problems allows travellers to adjust their route or mode of travel accordingly. In a Finnish project 33% of users reported changing travel mode based on information received on portable wireless devices, and 50% changed route based on the information. Another project reported 40% of users stating they had changed mode based on information received on their wireless devices, while 15-25% were willing to start their journey earlier [6]. Similarly, in a Philadelphia study, 66% of surveyed commuters changed their departure time, and 86% changed their route after receiving traveler information [1].

The literature also identified several projects that implemented in-vehicle navigation (IVN) devices. The CLEOPATRA project in Turin, Italy demonstrated a timesaving of more than 10% for cars equipped with the IVN devices. Customer satisfaction measures ranged from 50-75% of users expressing satisfaction with the devices. However, 20% of the test drivers in Rotterdam expressed concern over being distracted from the driving task [6]. This would indicate a preference for a hands-free source of information, as may be available through an IVR application for 511 systems.

2.2 Public Agency Benefits

The primary goal of any public operating agency is to improve safety on the roads under its authority. Telephone-based ATIS improve safety by allowing travellers to make informed decisions regarding routes that will help them to avoid congested areas. This typically reduces secondary collisions by allowing informed travellers to redirect their path away from a trouble area.

Telephone-based ATIS also allow operating authorities to better manage their road infrastructure. These systems:

- Assist these authorities in managing travel through periods of high congestion;
- Assist road users with information concerning upcoming and on-going construction activity, and may be used to fulfil legal requirements concerning public notifications of upcoming construction activity. Telephone-based ATIS are particularly effective relative to printed materials in circumstances where there are multiple stages of construction, and conditions are continually changing;
- The statistical tracking features normally included as part of the system diagnostics, and/or an evaluation system, may be used by operating authorities as a Performance Management tool; and
- Through comment line capabilities, telephone-based ATIS may act as a means of detection for required road and plant repairs, and for ancillary issues such as litter removal.

By noting the location of trouble areas, telephone-based ATIS provide 'passive diversion' opportunities by telling road users where *not* to be. However, as the detection coverage improves on non-freeway links (e.g. arterial and local roadways), operating authorities will have the ability to perform 'route balancing' and provide 'active diversions' that tell road users what the best alternatives are for their direction of travel. 'Active diversion' capability will be of particular benefit to emergency service operators such as fire, ambulance and police.

A 2003 study prepared for Federal Transit Administration USDOT called 'information technology' the single greatest opportunity to enhance the quality of the transit travel experience. The expectation is that better information will contribute to the satisfaction of transit customers, who will choose transit more often and remain as committed transit riders for longer periods. This may also attract new riders who would otherwise be reluctant to use public transit [7].

Lastly, the success of a public service system, like 511, can be a positive public relations tool for a public operating agency. The American experience has been that conversions of existing systems to 511 systems significantly increases usage of the system, thereby demonstrating its value to the travelling public. Most 511 service implementers in the U.S. have seen a 300 – 500% increase in call volumes simply by converting an existing 7 or 10-digit travel information line to 511. For example, Southeast Florida experienced a significant increase in call volumes (i.e. 650%) by converting an existing travel information phone number to 511. For some 511 systems, major events (weather, incidents, etc.), especially in conjunction with peak travel times, can cause call volumes in a single day to exceed the call volumes of an average month [8].

2.3 Private Sector Benefits

Local broadcast media (radio and television) subscribe to ATIS to enhance the services provided to their listening / watching public. Broadcast media typically requires more direct access to data than simple access to a user telephone interface. However, the traveller information products originating from operating authorities that have deployed 511 services are typically branded as 511 information, though it may not be distributed via the telephone. This '511 information', be it delivered by fax, email, system interface or other means, may then be used to supplement the media's news, sports, weather and other information to provide a better service that their customers will view as more comprehensive.

Commercial transit (motor coach lines), taxicab operators, and commercial trucking are agencies that are interested in monitoring route travel times and road conditions. Each is interested in the factors that may affect the delivery of their goods or services.

Similarly, large employers are interested in participating in ATIS because it affects their workforce access and egress, their ability to deliver their goods or services, and in the case of manufacturing, whether their 'just-in-time' delivery will be on-time.

Lastly, ATIS is used by hotels, convention centres, and major tourism attractions, etc. to provide their customers with route and mode choice information that enhances their visit.

2.4 Environmental Benefits

The ability of ATIS to divert travellers from a particular route or mode of travel has the effect of reducing congestion, and thus emissions. A Boston study used the EPA MOBILE5a emissions model to estimate impacts "with" and "without" SmarTraveler telephone service (a pre 511 system). Based on an assumption that 30% of all daily callers would change their travel plans as a result of information (which is consistent with the choices measured in other studies) this adjusted travel behaviour reduced volatile organic compounds by 498 kilograms (25%), reduced NOx by 25 kilograms (1.5%), and reduced CO by 5,032 kilograms (33%) daily. While these estimates were significant for participating drivers, they represented only 28,800 daily trips in the Boston metropolitan. The implication is that these promising environmental impacts may be more pronounced if access to traveller information were to be provided to a larger percentage of Boston's 2.9 million registered drivers [9, 1].

However, there are there other studies that suggest more mixed impacts of telephone-based ATIS on the environment. A Seattle study examined the potential benefits of ATIS for a sub network of its downtown area. The study considered 30 different scenarios, each consisting of a combination of weather conditions, traffic incidents, and traffic demands. It determined that the energy consumption and emissions impacts of ATIS use were not statistically significant [2].

3. ATIS & 511 COSTS

It is important to develop a clear understanding of the on-going operating and maintenance costs associated with a telephone-based ATIS. Start-up costs will include establishing communication infrastructure (if not already available), negotiating with telecommunications carriers, developing the central system facilities, and a significant amount of development effort on the part of staff. The on-going costs involve operating staff time, data fusion activities, stakeholder liaison, marketing, distribution systems operation and development, expansion activities, and maintenance.

There are costs associated with the time needed to develop markets for the private sector and to support vendors and consultants in the development of the 511 system. There are also costs associated with the development of relationships and partnering in the 511 system [10].

The level of detail available for information on the costs of implementation for telephone-based ATIS is relatively poor. It is difficult to compare deployment costs as a number of influencing factors come into play, including:

- The scale of the 511/telephone-based deployment;
- The levels of existing supporting infrastructure already deployed (e.g. communications networks, ATMS, traffic control centre, etc.);
- The funding formula used (e.g. the level of subsidy obtained from the federal and state levels, the basis for operating funds, etc.);
- The mixture of public and private infrastructure and services used to build, operate, and maintain the system;

The 511 Deployment Coalition's Implementation And Operational Guidelines For 511 Services (Ver 2.0.) suggests that while these deployment costs are variable, they can be estimated as US$0.25 per call for the telecommunications costs plus the cost of the ATIS system, which varies depending on the type of system, as noted above [8]. The report goes on to suggest the following generalized capital, operations and maintenance costs:

System Type	Associated Costs
Highly Automated, with Limited or No Human Involvement in Operation	Least costly to establish and to operate. Approximately US$100,000 to deploy and US$10,000 annually for O&M.
Automated System, with Human Recorded Information	These systems are typical associated with metropolitan traffic / multi-modal services. To establish such a service could cost US$500,000 to $1 million, with approximately US$1 million annually for O&M.
Human Operator-based System	This type of system is the most costly due to high staffing levels required. An annual operating budget for a large transit information center can exceed US$4 million [8].

By way of example, Nebraska's conversion from a previous traffic and weather information system to a 511 system (everything else remaining the same) had a capital cost of US$120,000, with an annual operating and maintenance cost thereafter of US$110,000 [11]. Even these costs may vary significantly between jurisdictions, depending on the amount of telecommunications work to be completed.

In turnkey American 511 operations, operations and maintenance costs often manifest themselves as per-call, or per-minute charges for the 511 service. These costs can vary widely depending on the service provided by the vendor, the anticipated annual call volume, the data to be included in the system, the amount of manual data fusion to be provided, and the amount of risk the vendor is exposed to over the course of its operating contract. For example, per-minute costs may vary from US$0.02 to US$0.12 per minute and more, depending on these parameters. Some operating authorities pay a per-call flat fee with per-minute charges over that. In San Francisco the public agency (the Metropolitan Transportation Commission) is paying for calls to the system at US$0.031 per call plus US$0.01 per minute for call forwarding [12].

4. LESSONS LEARNED IN 511 AND OTHER PHONE-BASED ATIS DEVELOPMENT

In developing RoadInfo, and the many ATIS deployments to-date, there have been many discussions regarding the "lessons learned". There is a significant body of information available on these matters within the industry. The following summarizes these lessons-learned, and explains how they can act as guiding principles in the development of a new ATIS, or the upgrade of existing ATIS services.

4.1 System Planning

When developing a local 511 service, the big questions surround what the service is supposed to accomplish. To get the 'big picture', one must begin by identifying the system stakeholders, and focusing on their needs. Customer and stakeholder needs should drive the overall 'vision' of what the ATIS is supposed to accomplish.

The 'vision statement' should act as a touchstone through the course of the planning phase for the Canada 511 Development Plan. Returning to the list of user needs and periodically refocusing on the target audience will ensure that the system development resources are being used optimally. There are diminishing returns if deployment guidelines are developed that are not of use to the implementing agencies customers.

It is important to tailor the products of the 511 system to meet the changing expectations of consumers. To identify these expectations, periodic focus groups of local travellers would be beneficial. In this way, trends can be tracked over time, and needs can be anticipated [13].

Who are the ATIS consumers? Apart from the agency stakeholders such as emergency service providers and road operating authorities, the traveling public represents the largest stakeholder group. Lappin [3, 14] has identified the young commuting motorists (26-46 years of age) as the most common user. Her study further indicated that ATIS use increases with the users level of education and income. Usage further increased proportionally with local congestion levels and alternate route availability. In determining the target market for the ATIS, these demographic issues need to be considered.

The FHWA's *Developing Traveller Information Systems Using the National ITS Architecture* [15] provides insight into traveller information consumer priorities:

- Traveller information must be timely, accurate, relevant, and reliable;
- Most traveller information consumers would be unwilling to directly pay for traveller information alone (unless significantly better than that which is available free-of-charge);
- Many consumers find traveller information an attractive feature when it is bundled with for-pay services (e.g. news, stock quotes, sports scores, etc.);

- Travellers are generally most interested in having information for long-distance trips or for travel in unfamiliar areas;
- Travellers are generally less interested in having information for local or familiar trips. However, they are interested in avoiding any extended delays or other inconveniences;
- Travellers are generally more interested in having en-route information than in having pre-trip information.

It is also important to remember that the needs of the transit riding public do not necessarily match those of the motorist. A customer preferences study conducted by Battelle Memorial Institute and Multisystems, Inc. indicated that transit riders prefer traditional printed information media to real time information for pre trip planning. Furthermore, the telephone was the third choice of preferred ways to obtain both static and real time transit information behind printed and computerized means [7]. ATIS transit customers cite the following benefits: reduced stress, improved satisfaction regarding decision to take transit, and a greater control over time travel decisions [16].

A successful kick-off strategy for operating authorities has been to foster their ATIS development plans from within their organizations. It is a valuable asset to have senior government and/or political officials supportive of the initiative, and who will act as a voice and champion within Council [10].

This key support is best sustained by demonstrable successes. A reasonable work plan with achievable goals should incorporate plans for some 'early successes'. Therefore, it is important to plan and build a very achievable system, and plan for expansions at a later date. These successes will provide momentum for the project and help justify the growth of the system into further stages of deployment.

ATIS data quality and breadth of coverage are very important. The public wants a feel for the 'big picture', so completeness of data coverage is paramount [13, 17]. To fill-in the 'data gaps', data sharing agreements between two or more agencies are typically developed through the course of deploying an ATIS. For example, a municipal system may team with a state or provincial agency to provide more comprehensive information on a given road network. Other potential partners include local broadcast media outlets that may be in a position to act as a data source.

This data coverage, and the way data is presented to the end-user, will speak to the user-friendliness of the system, and the system's probability of success. For this reason, it is vitally important to make sure that the operating authority has 'got it right' before letting the product out to the public. If the product is not good enough, or if the quality lapses over time, the user will quickly lose confidence in the system and will be reluctant to use it again.

4.2 Regulatory and Legal Issues

4.2.1 PRIVACY ISSUES

Industry direction suggests that the incorporation of appropriate system firewalls is necessary to protect the integrity, and safeguard the use of the ATIS data. This approach will be further investigated to provide implementers with a sense of the appropriate level of protection that should be afforded a traveller information system.

Secondly, it will be necessary to develop 'freedom of information' and 'protection of privacy' policies. To this end, ITS America has published an 'ITS Fair Information and Privacy Principles' report that provides guidelines for developing such a policy. In addition to these guidelines, there are many industry examples (e.g. Puget Sound Area Smart Trek Privacy Policy, Caltrans Operations Policy, etc.) to reference in the development of a Canadian policy. Such policies often differentiate between the use of video images and non-video data, and thus contain direction that is directly applicable to a 511 deployment.

4.2.2 PARTNERING AGREEMENTS

Partnering agreements, in the form of Memoranda of Understanding, or more formal agreements, are used to ensure that mutual needs are explicitly stated, and to assign agency responsibilities. It should be recognized that this agreement process could be time consuming [15]. The memoranda may be used to:

- Delimit use and distribution of data;
- Limit liability associated with the use of data;
- Assign funding and operating responsibilities;
- Confirm related hardware and software ownership, and responsibility for associated replacement and maintenance costs;
- Identify necessary retention periods, appropriate uses for the data, and appropriate distribution lists for the data;
- Address legal concerns;
- The development of guidelines on indemnification will distribute responsibility for inappropriate actions, and will define the limits of claims [10].

ATIS operating authorities commonly find that they must revisit Memoranda of Understanding from time-to-time to foster the continued support of participating agencies. Several factors may lead to the interruption of participation amongst agencies contributing data to the system. Budget cuts, changing management directions, and particularly personnel changes can all lead to data gaps, or delayed delivery of time-sensitive information.

Agreements with broadcast media must be carefully developed and maintained. The media play an increasingly important role in the distribution of traveller information. However, once data is released to the media, its subsequent use is essentially out of the operating authority's hands. To make sure that the data is presented in a manner that suits the authority, and that appropriate credit (i.e. branding) for the data stream is conveyed to the public, some form of periodic monitoring is suitable. It would be appropriate to have media partners provide a reference to the 511 system as part of their agreement for access to data (including camera images), as is done with the SmarTraveler system in Boston.

Lastly, it is important to develop business incentives for partnerships. For instance, implementers should try to create a market for the private sector to encourage their participation. To maintain the support of participants you need to demonstrate benefits for each participant, ensure that the benefits and costs are distributed evenly, and ensure that all participants are operating under a business plan that explicitly states commitments, goals, and expectations of outcomes [10].

4.2.3 OWNERSHIP RIGHTS

The assignment of certain intellectual property rights to the private sector may be used as a powerful incentive for participation. The identification of a clear policy on intellectual property rights should be an early objective, as this improves contract negotiation processes and avoids negotiations arising from contract disputes [10].

4.3 Telecommunications Issues

The successful deployment of a Canada 511 system across the nation will depend upon the cooperation and participation of many telecommunications carriers. The experience within the U.S. 511 system deployment is that coordination with these agencies can be a lengthy, and at times combative, process. Therefore, engaging the Canadian telecommunications industry early in the Canada 511 system development process will be necessary. Keeping these agencies advised concerning the status of the project would foster cooperation. Furthermore, these agencies may have valuable inputs regarding process and technical requirements.

There are three important types of telecommunications stakeholders negotiations to pursue early in the development of the 511 system; landline, wireless, and payphone carriers. These three types of carriers will be concerned about the process and costs associated with the proposed system architecture, which will determine the proposed means of switching. It will be important to identify a cost effective means of call routing in coordination with telecommunications providers. The common approach used by 511 system implementers in the United States is to provide a toll-free number and telecommunication carriers then route 511 calls to this toll free number. This allows local use of 511 and out-of-service-area use of the toll free number [12, 18].

It will be key to explore, early in the process, the costs of implementation with these agencies. This will permit budgeting and assignment of funding and resource responsibilities. There is a need to get telecommunication carriers to (a) commit resources and (b) develop appropriate supportive services as part of an on-going 511-deployment program. The big telecommunication carriers (e.g. Bell) may wish to develop a solution that suits all of its markets, and not just the market (local implementer) currently developing a 511 system. This will take time and may slow down development at a local level.

There may be merit in the use of a telecommunications expert in the design of the system and for coordination with other carriers regarding call routing [19, 20].

4.4 Design Institutional Framework

4.4.1 ASSESSMENT OF THE BUSINESS MODEL OPTIONS

A fundamental conclusion that has been reached with respect to ATIS business models, is that the early assumption that ATIS would be a revenue generator, and that the data assets would be of significant value to the private sector, was mistaken. To date, industry has failed to find a successful profit-driven business model [17]. In the current marketplace, ATIS has not proven to be profitable because:

- There is a weak market for the data;
- In most markets, the data offered isn't comprehensive enough to provide a 'complete package' meeting all the target customer's needs; and
- The public is reluctant to pay for services that they believe they can get for free from broadcast media (such as radio and television).

It is perhaps this last point that best explains the seemingly contradictory indications that there is a public expectation that ATIS services and products will become increasingly available, but that these services will be provided at little or no cost to the travelling public.

One general example of a partial success in private-sector ATIS supply is the success of broadcast media in providing traffic reports. In addition to local news media, there are examples in the United States of nationally-based firms (e.g. Metro Networks) who provide these services. By bundling together traffic information with additional content related to news, current events, and particularly weather information, these information providers continue to find value in performing this function. However, it should be noted that traffic reports in themselves do not constitute an ATIS, and these models are only successful because they bundle content of various types to create value for their customers. The individual components (traffic, news, weather) on their own may not be sufficiently desirable to customers, and would therefore not draw the advertising revenue support necessary to make this business viable.

The end result is that ATIS, including 511 systems, continue to be implemented using public funds, either in the form of seed money to establish an operation (such as Mobility Technologies model), or with on-going budgetary contributions (as with SmarTrek in Seattle or RoadInfo in Toronto). It is generally agreed that it currently takes public funds to implement, operate and maintain a successful ATIS.

Consequently, operating authorities must look beyond the traditional positive benefit-cost outcome in support of a business case for implementation. The extensive non-monetary benefits must be considered, including the added benefits to associated traffic management systems (e.g. control center operations), programs (e.g. travel demand management, public outreach, etc.), and safety (e.g. contributions to incident management). Quantitative, non-monetary measures of effectiveness are readily monitored (e.g. call center volumes, system access frequency, system operational time, customer satisfaction surveys, improvements to incident response time, etc.), and may be used to highlight the benefits of the system.

4.4.2 ADVOCACY, MARKETING & EDUCATION

Studies in Boston and San Francisco [6] have demonstrated that the level of usage for an ATIS is directly related to the level of marketing applied. In Boston, users were polled to determine where they first found out about the SmarTraveler system there, and 45% stated it was traditional broadcast media such as radio or TV ads. The usage stats there showed jumps in use with each new advertising push.

In San Francisco, the TravInfo system had an aggressive advertising push in 2000 using billboards, Internet banners, radio, advertising in the regional American Automobile Association (AAA) publication, and in the tour books for the Bay Area. TravInfo experienced a 73% increase in usage over the previous year. In the Spring of 2003, following a one-week advertising push on talk shows, news spots and DMS, similar efforts resulted in a 1000% increase in the number of comments left on the RoadInfo (Toronto) system, weekly.

These marketing activities need not be seen as a discrete exercise or involving dedicated funding. Most jurisdictions currently conduct outreach to their constituents through construction notices, utility bills, and politician's mail-outs. An effective logo (providing product branding) and associated telephone number (such as 511) can be effective in these instances to support and promote the ATIS as a source of transportation information and public feedback [21].

In operating an ATIS, some U.S. jurisdictions have placed a significant amount of credit on 'product branding' for making their systems successful. For example, Washington State DOT puts significant effort into branding by ensuring that the visual and audio queues are consistent across the array of data dissemination tools the State offers (511 telephone line, website, printed materials, etc.). They credit their extremely high usage rates on their success in branding their useful products. The ATIS developers find that expansions and improvements to their systems are easier to justify when backed by high usage figures.

4.4.3 EVALUATION

It is difficult to apply traditional "before and after" quantitative analysis for the evaluation of an ATIS. Nevertheless, it is extremely important to build-in performance measures that will speak to the effectiveness of the system in fulfilling its stated goals. ATIS systems, like any other infrastructure, have to demonstrate their effectiveness to justify on-going support and additional funds for expansion. Too often agencies do not define these performance measures until after the system is built, and key components that would have assisted in measuring performance may have been omitted.

Using system usage as an indicator of the success of the system, there are a number of 'internal performance indicators' to track:

- Frequency of message access;
- Frequency of comments left on the system;
- Percentage of time the system is accessible by the public (i.e. measure of 'down-time' for system maintenance, faults, or all phone lines in use); and
- Customer satisfaction with the system (measured through monthly surveys).

'External performance indicators' are those outward indicators that the use of the 511 service is having a positive effect. These factors are typically more difficult to measure and to attribute to the ATIS in particular. Typical measures include:

- Safety (e.g. percentage reduction in collisions);
- Arrival Time Reliability (e.g. percentage on-time arrivals); and
- Cost Savings (e.g. reduced gas consumption, time savings, etc.)

However, there were few examples of these evaluation measures in the literature that were empirical rather than modelled results.

One readily accessible external performance indicator would be customer satisfaction surveys.

4.5 The U.S. Deployment Coalition Deployment Assistance Reports

The U.S. 511 Deployment Coalition has published a number of Deployment Assistance Reports (DAR's) that provide local implementers with direction in terms of desirable content and format consistency. The objective of the DAR's is to promote a uniformity across the 511 deployments such that a user driving from one 511 area into another will experience a seamless operation.

The U.S. 511 Deployment Coalition has published the following DAR's to-date:

- Implementation And Operational Guidelines For 511 Services Version 2.0.
- 511 DAR#1 - Business Models & Cost Considerations
- 511 DAR#2 - Transfer of 511 Calls to 911
- 511 DAR#3 - 511 and Homeland Security
- 511 DAR#4 - 511 Regional Interoperability Issues
- 511 DAR#5 - 511 Public Transportation Content
- 511 DAR#6 - Weather & Environmental Content on 511 Services

- 511 DAR#7 - Roadway Content Quality on 511 Services

The state deployment case studies [12, 19] clearly indicate that the DAR's should be followed when deploying a 511 system.

These reports are directly applicable to the development of a Canada 511 system. These documents will be reviewed in greater detail within Task 4 of the 511 Readiness in Canada Project. This task follows the development of the draft Functional Requirements (Task 3.1), and as part of that review, these reports will be reviewed in terms of the following stakeholder needs:

- Regional needs (e.g. border issues, ferry services, rural issues, urban issues, the North, etc.);
- Multi-lingual issues;
- The potential range of transportation stakeholder needs (e.g. transit, para-transit, freeway operations, arterial operations, etc.);
- The potential range of weather stakeholder needs (e.g. there may be needed tools that Environment Canada has not yet considered); and
- A reasonably broad (if not complete) representation from each of the provinces and territories.

4.6 Schedule for Deployment

The FHWA's *Developing Traveller Information Systems Using the National ITS Architecture* [15] provides the following lessons learned in scheduling the deployment of an ATIS:

- Do not adopt an optimistic schedule;
- Define frequent and realistic milestones to use in assessing progress against the schedule;
- Define unambiguous milestones;
- Make reasonable efforts to keep the project on schedule. However, do not reduce the time needed to conduct design reviews or documentation. When needed to preserve these critical activities, extend the schedule.

It was noted amongst several of the 511 Case Studies, that ample time should be scheduled to address the issues surrounding the involvement of the telecommunications industry.

5. CONCLUSIONS

The results of the literature Review support the stated objectives for this task. Specifically, the Literature Review has demonstrated that ATIS, and 511 systems in particular, benefit the general public, public agencies and the private sector.

The Review determined that there is a wide range of potential commissioning, operations and maintenance costs amongst existing deployments. The system architecture selected has a significant bearing on the total operations costs.

The review also provided significant insight into the issues that must be addressed within the Canada 511 Development Plan.

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5 Alan Toppen, et al., *Time Management Benefits of ATIS for Unfamiliar Urban Drivers*, October 2002

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18 R. Schuman, *511 Case Studies – Utah CommuterLink*, 511 Deployment Coalition, December 2001

19 Rich Schuman, *511 Case Studies - Shenandoah Valley, Virginia*, 511 Deployment Coalition, December 2001

20 Rich Schuman and Ely Scherer, *Minnesota 511 Case Study*, 511 Deployment Coalition, July 2001

21 Ziegler, *511 Travel Information Systems Status Report*, Washington State DOT, February 2003

APPENDIX B1

REFERENCE MATERIALS

REPORT TITLE: **ITS BENEFITS AND COSTS DATABASE DESK REFERENCE**	**DATE:** **March 24, 2004**
REPORT AUTHOR (S): http://www.benefitcost.its.dot.gov/its/benecost.nsf/bylink/deskreference	**REF. NO. 1**

Lessons Learned	
Benefits & Costs	IDAS models of ARTIMIS in Cincinnati and Northern Kentucky estimated traveler information reduced fatalities 3.2%.
	In the DC metro area, a simulation model estimated that commuters who used traveler information improve their on-time reliability 5-16%.
	A simulated traffic network in Seattle showed that supplementing freeway ATIS with arterial ATIS may not significantly improve throughput.
	In Philadelphia, 66% of surveyed commuters changed their departure time, and 86% changed their route after receiving traveler information.
	In the DC area, models showed pre-trip departure notification can reduce early/late arrivals and save 40% of users $60 or more each year in lost time.
	Models of vehicle emissions in Boston showed users of Smart Traveler generated 1.5% less NOx, and 25% less VOCs.

REPORT TITLE: **ITS Impacts Assessment for Seattle MMDI Evaluation: Modeling Methodology & Results**	DATE: September 1999
REPORT AUTHOR (S): **K. Wunderlich, J. Bunch, and J. Larkin**	REF. NO. 2

Lessons Learned	• ATIS has largest impact during conditions associated with the worst congestion: heavy demand, major accidents or extreme weather. • 80% of the total delay reduction from ATIS is accounted for a set of scenarios (including heavy demand, a major accident, and extreme weather) with a combined probability of 28%. • ATIS effectiveness under these conditions is reflected in its impact on travel time variability. ATIS impact on annual travel time variability (-2.5%) was larger than the study' s ATMS experiment (-2.1%). • Fatal crash rate declines 0.6%.

REPORT TITLE: **What Do ATIS Users Want? A summary of ATIS Customer Response Research 1995-2000**	DATE: April 2001
REPORT AUTHOR (S): **J. Lappin**	REF. NO. 3

Lessons Learned	Why drivers consult ATIS All travelers want to reduce trip uncertainty Drivers (and, some transit riders) consult ATIS to (in order of frequency): • Assess traffic on their route • Judge the effect of incidents • Decide among alternate routes • Estimate trip duration • Time their trip departure
	How drivers use ATIS: Customers report that they regularly change their trip or their expectations from ATIS information. • Time of departure • Part or all of their route, potentially lengthening trip mileage or duration • Adjust their expectations ATIS customers identify benefits from use • Saved time • Avoided congestion • Reduced stress Avoided unsafe conditions

REPORT TITLE: **On-Time Reliability Impacts of Advanced Traveler Information Services (ATIS)**		**DATE:** **October 2002**
REPORT AUTHOR (S): **Karl Wunderlich, Matthew Hary, James Larkin, and Vaishali Shaw**		**REF. NO. 4**
Benefits & Costs	ATIS provides significant benefits in terms of the reliability of reaching trip destination on time.	
	Study showed that users of ATIS data had only a 3% chance of arriving at their destination after their intended arrival time, while conservative non-ATIS users were late 8% of the time and aggressive non-ATIS users were late 19% of the time.	
	Based on 75,000 trips in the Washington DC area.	

REPORT TITLE: **Time Management Benefits of ATIS for Unfamiliar Urban Drivers**	**DATE:** October 2002
REPORT AUTHOR (S): **Toppen, Alan, et al.**	**REF. NO. 5**

Lessons Learned	
Benefits & Costs	Based on simulated trips on the Washington, DC network, both ATIS users and ATIS non-users were on time approximately 99% of the time. However, drivers that used ATIS significantly reduced the amount of time spent on early arrivals. Using ATIS, unfamiliar drivers arrived at their destination within 15 minutes of the target arrival time 79% of the time. Without ATIS, unfamiliar drivers arrived within 15 minutes 42% of the time.

REPORT TITLE: **Cordis Transport Sector of the Telematics Applications Programme, 4th Framework Programme for RTD&D 1994 – 1998**	**DATE:** **August 1, 2000**
REPORT AUTHOR (S): http://www.cordis.lu/telematics/tap_transport/reserach/10.html	**REF. NO. 6**

Benefits & Costs	This report summarizes the evaluation results for a large number of ITS projects implemented in Europe between 1994 and 1998. The document does not provide detailed descriptions of the individual projects, the context of their implementation or the manner in which they were evaluated. Nevertheless, the document does highlight benefits associated with a number of ATIS projects as described below:
	• In a Finnish project 1/3 third of users reported changing travel mode based on information received on portable wireless devices, and 1/2 changed route based on the information. Another project reported 40% of users stating they had changed mode based on information received on their wireless devices, while 15-25% were willing to start their journey earlier.
	• Six projects provided traveler information via public access terminals or fixed information terminals. Cited projects reported 79-95% of users finding the systems easy to use.
	• Internet information during six of the projects also had a high level of user acceptance, with 65-75% of respondents indicating that the information was easy to use and understand.
	• Several projects implemented in-vehicle navigation (IVN) devices. The CLEOPATRA project in Turin, Italy demonstrated a time savings of more than 10% for cars equipped with the IVN devices. Customer satisfaction measures ranged from 50-75% of users expressing satisfaction with the devices. However, 20% of the test drivers in Rotterdam expressed concern over being distracted from the driving task.
	• Roadside driver information projects discussed in this report focused on the impacts of messages displayed on VMS signs and the effectiveness of different information strategies. A collaborative study among the various projects found that on average 60% of drivers noticed VMS information. An average of 13% of drivers who noticed VMS information, substantially diverted from their intended route. In Piraeus, Greece, the route guidance system combined with an integrated traffic control strategy led to a 16% reduction in travel time.

REPORT TITLE: **Customer Preferences for Transit ATIS: Research Report**	**DATE:** **August 2003**
REPORT AUTHOR (S): **Battelle Memorial Institute and Multisystems, Inc. prepared for Federal Transit Administration USDOT**	**REF. NO. 7**

Lessons Learned	For pre trip planning purposes the highest preferences are for timetables.
	Traditional or static forms of information are preferred over real time information for pre trip planning.
	The two ways that transit customers prefer to obtain pre trip information is through printed forms such as schedules and via the computer.
	Trip time forecasts were the most preferred kind of real time pre trip information.
	The telephone was the third in order of preferred ways to obtain both static and real time transit information behind printed and computerized means.
	On route information was substantially less desirable than pre trip information for transit riders. Once a transit trip is initiated options are relatively few for transit users and the traveller has most of the information he or she wants. Having said this the preference for information on route were directed towards electronic message signs or video monitors.
	Ion addition to real time information on routes static information printed on paper or on signs at transit stops or in buses was also considered essential by many riders. Many of the stakeholders consulted were concerned that introducing advanced information technologies would result in fare increases or service reductions. It was further noted that while many user recognize advanced technologies would provide better information faster to the travelling public they pointed out that many passengers would not be able to afford the computers or PDA's that may be needed to access this information.
	One suggestion shared by many in the related workshops was to provide accurate timekeeping at all stops and free telephone access to transit agencies with dedicated lines. There was a preference for a live person rather than an automated touchtone or voice response phone information system.
Benefits & Costs	Information technology provides the single greatest opportunity to enhance the quality of the transit travel experience.
	The expectation is that better information will contribute to the satisfaction of transit customers who will choose transit more often and remain as committed transit riders for longer periods. This may also attract new riders who would otherwise be reluctant to use public transit.

REPORT TITLE: **IMPLEMENTATION AND OPERATIONAL GUIDELINES FOR 511 SERVICES VERSION 2.0.**	**DATE:** **September, 2003**
REPORT AUTHOR (S): **PUBLISHED BY THE 511 DEPLOYMENT COALITION** http://www.deploy511.org/guidelinesv2_intro.htm	**REF. NO. 8**

Lessons Learned	Long term (by 2010) objectives of coalition include:
	▪ 511 will be operating throughout the United States.
	▪ Over 90% of the nation's population will be aware of 511.
	▪ 511 systems will receive more than 40 million calls per year (Note that there were 1.8 million calls during the month of Jan. 2004. At an annual rate, this is more than 50% of the goal for 2010. It would appear that 511 use is increasing more rapidly than projected.)
	▪ Road information on major road systems and metro areas will include travel time, events and weather.
	▪ There will be a sustainable business model – public sector supported with funds to enhance and grow. The 511 Deployment Coalition clearly expects that 511 services will continue to be at least partially funded by the public sector.
Benefits & Costs	Most deployers have seen a 300 – 500% increase in call volumes simply by converting an existing 7 or 10-digit travel information line to 511. For example, Southeast Florida experienced a significant increase in call volumes by converting an existing travel information phone number to 511. The system used to receive 15,000 per month; however, with 511 as the access number, the system now receives more than 100,000 calls per month – an increase of over 650%. For some 511 systems, major events (weather, incidents, etc.), especially in conjunction with peak travel times, can cause call volumes in a single day to exceed the call volumes of an average month.
	Deployment costs are variable but a good rule of thumb estimate is US$0.25 per call for the telecommunications costs plus the cost of the ATIS system which varies depending on the type of system.
	Highly Automated, Limited or No Human Involvement in Operation:
	Least costly to establish and to operate. Approximately $100,000 to deploy and $10,000 annually for O&M.
	Automated System, with Human Recorded Information:

REPORT TITLE: **IMPLEMENTATION AND OPERATIONAL GUIDELINES FOR 511 SERVICES VERSION 2.0.**	**DATE:** **September, 2003**
REPORT AUTHOR (S): **PUBLISHED BY THE 511 DEPLOYMENT COALITION** http://www.deploy511.org/guidelinesv2_intro.htm	**REF. NO. 8**

	These systems are typical of the metropolitan traffic/multi-modal services. To establish such a service could cost \$500,000 to \$1 million. A rule of thumb for system operations would be \$1 million annually.
	Human Operator-based System:
	Most costly due to high staffing levels required. An annual operating budget for a large transit information center can exceed \$4 million.

REPORT TITLE: **Air Quality Benefit Study of the SmarTraveler Advanced Traveler Information Service**	**DATE:** **July 1993**
REPORT AUTHOR (S): **Tech Environmental, Inc.**	**REF. NO. 9**

Lessons Learned	Surveys performed in Seattle, Washington and Boston, Massachusetts indicated 50% of travelers changed their travel route and 45% changed their departure time as a result of better traveler information. In addition, 5-10% of travelers changed their travel mode based on better traveler information.
Benefits & Costs	The impact of traveler information on emissions in Boston was calculated based on an assumption that 30% of all daily callers would changed their travel plans as a result of SmarTraveler information. Using the EPA MOBILE5a emissions model to estimate impacts "with" and "without" traveler information, this adjusted travel behaviour reduced volatile organic compounds by 498 kilograms (25%), reduced NOx by 25 kilograms (1.5%), and reduced CO by 5,032 kilograms (33%) daily. While these estimates were significant for participating drivers, they represented only 28,800 daily trips in the Boston metropolitan area that had 2.9 million registered drivers.

REPORT TITLE: **Successful Approaches to Deploying a Metropolitan Intelligent Transportation System (US DOT – Research and Special Programs Administration)**	**DATE:** **March 1999**
REPORT AUTHOR (S): **A. DeBlasio, D. Jackson, A. Tallon, G. Powers, J. O'Donnell (John A. Volpe National Transportation Systems Centre, Economic Analysis Division)**	**REF. NO. 10**

Lessons Learned	
1. Planning Regionally	Implementers should think regionally and plan in logical areas, not by jurisdictional boundaries.
	Build on existing personal and institutional relationships and take advantage of institutional memory from previous work, projects, etc. This will save time and will allow the system to develop quicker.
	Include non traditional participants to obtain a fresh perspective.
	Develop a shared vision amongst stakeholders. This will facilitate more interaction between the planning and operational sides of the process.
	Build on existing ITS systems wherever possible rather than starting from scratch.
2. Make ITS Visible	Implementers should plan for public outreach processes. Public support results in political support, and ensures that users needs are addressed appropriately.
	Implementers should foster support from policy makers and upper management. They should educate management to facilitate future programs and continued mainstreaming of ITS. Having senior management participate in interagency coordinating groups will foster support and bring in additional partners.
	Implementers should include regional planning authorities in the development process. They should investigate how ITS can support the planning authorities objectives. This may provide access to a significant group of potential supporting stakeholders.

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3. Understanding Nuances of Partnering	**Take time to develop relationships amongst partner and ensure that the differing needs and objectives of these partners are addressed.**
	Explicitly define roles and responsibilities, defining leadership, sharing risk, appropriate mix of public and private support, etc.
	It is important to develop incentive for partnerships. For instance, implementers should try to create a market for the private sector to encourage their participation.
4. Plan for Long Term Management and Operations	To maintain the support of participants you need to demonstrate benefits for each participant, ensure that the benefits and costs are distributed evenly, and ensure that all participants are operating under a business plan that explicitly states commitments, goals, and expectations of outcomes.
	Foster buy in internally by including field staff, operations staff, etc.
	Facilitate private sector involvement and take advantage of its unique strengths (example public relations, marketing, integration, etc.).
5. Develop a Regional Management Structure	Identify a full time project manager and assign this person appropriate authority and resources as appropriate for the phase of the project.
6. Appropriate Procurement Mechanisms	Include the appropriate procedures within the contract for any necessary transition of ownership or responsibility from the develop/vendor to the user/operator.
7. Address Intellectual Property Rights Issues Early	The assignment of certain intellectual property rights to the private sector may be used as a powerful incentive for participation. The identification of a clear policy on intellectual property rights should be an early objective as this improves contract negotiation processes and avoids negotiations arising from contract disputes.

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8. Develop Written Policies	Address equipment issues (e.g. CCTV). This may reduce liability. However, must address necessary use by emergency services and public safety officials.
	Identify the proposed ownership of hardware software replacement maintenance costs.
	Delimit use and distribution of data.
	Identify necessary retention periods, appropriate uses for the data, and appropriate distribution lists for the data. These are to limit liability and ensure privacy of individuals.
	Address legal concerns. The development of guidelines on indemnification will distribute responsibility for inappropriate actions and will define the limits of claims.
Benefits & Costs	3-digit dialling will be key as area codes proliferate.
	There are costs associated with the time needed to develop markets for the private sector and to support consultants in the development of the 511 system.
	There are costs associated with the development of relationships and partnering in the 511 system.

REPORT TITLE: **The Roadrunner (December 2001/Janauary 2002)**	**DATE:** **March 24, 2004**
REPORT AUTHOR (S): **PUBLISHED BI-MONTHLY BY THE NEBRASKA DEPARTMENT OF ROADS COMMUNICATION DIVISION**	**REF. NO. 11**
Benefits & Costs	This report describes Nebraska's 511 systems and provides cost parameters for implementing and operating the 511 system.
	Capital cost: US$120,000 (Note this was the first year cost to implement the system, however, a phone based traffic and weather information system already existed. These initial costs were associated with transforming the existing system to 511).
	Annual O&M cost: US$110,000.

REPORT TITLE: **511 Case Studies – San Francisco Bay Area Metropolitan Transportation Commission**	**DATE:** **April 2001**
REPORT AUTHOR (S): **M. Mattes (Nossaman, Guthner, Knox and Elliott, LLP)**	**REF. NO. 12**

Lessons Learned	Identify telecommunications carriers early.
	Allow open access database, allowing local ISP to retrieve data for dissemination to any means they wish (any product or service) this fosters private sector involvement.
	San Francisco maintains 6 menu options at its highest level.
	• Public transit and para transit (information for all 28 agencies).
	• Current traffic conditions.
	• Car and vanpooling
	• Highway construction updates.
	• Parking, cycling, and airport ground transportation.
	• Questions, comments, and information.
	All information is provided free to users and third parties to encourage dissemination through public and private means.
	San Francisco's Travel Info (pre 511) experienced 65,000 call monthly and call frequency was higher during floods, strikes, power outages, etc.
	In 2000, 70% of calls were routed to public agencies, 30% obtained real time highway traffic, construction, and/or ride share information.
	There was a high percentage of calls from repeat users.
	55% of users modified their travel plans based on information received from the system.
	The system benefited by providing a toll free number and having the telecommunication carriers provide the routing of 511 calls to this toll free number. This allows local use of 511 and out of service area use of the toll free number.

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	It is key to identify the cost of implementation with the telecommunication providers. This will permit budgeting and assignment of funding responsibilities.
	San Francisco used AIN (Advanced Intelligent Network) central database approach for the call routing. All local telecommunication carriers reference a central table upon receiving a 511 call. The table provides a correlation between the appropriate 10-digit number and the location of the 511 call. This allows for central changes to numbers as they occur rather than modifications to local switching.
	There is a need to get telecommunication carriers to a. commit resources and b. develop appropriate services. This takes time but is a crucial element.
	The big telecommunication carriers (e.g. Bell) will wish to develop a solution that suits all of its markets, and not just the market currently developing a 511 system. This will take time and may slow down development at a local level.
	There is substantial marketing required to create an awareness of the system. Clear and frequent marketing opportunities should be pursued.
Benefits & Costs	In San Francisco the public agency Metropolitan Transportation Commission (MTC) is paying for calls to the system at 3.1 cents per call plus 1 cent per minutes for call forwarding.

REPORT TITLE: **Application of ATIS State of the Practice Analysis to the Maricopa AZTeck ITS Program**	**DATE:** **2002**
REPORT AUTHOR (S): **T. Buick (Transportation Director and County Engineer Maricopa County DOT), R. Schuman (PBS&J), F. Saleem (ITS Coordinator Maricopa County DOT)**	**REF. NO. 13**
Lessons Learned	Publication agencies should retain primary responsibilities for providing ATIS.
	Partnerships with private sectors should be pursued to provide value added services, improved dissemination, marketing, etc.
	The user stakeholders will only deem the services provided useful if the information provided is of a high quality and is reliable.
	It is important to tailor the products of the 511 system to meet the changing expectations of consumers. To identify these expectations, periodic focus groups of local travellers would be beneficial. Tracked trends over time to anticipate needs. Create a business environment for advance services to prosper to when the market is ready to pay for those services.
	The accurate and timely dissemination of ATIS data is the responsibility of public agencies, and only an opportunity for private firms. As ATIS benefits the public in terms of time, money, and lives saved, the responsibility lies first in the public funding, with an outreach to private firms an important but necessarily secondary pursuit.
	There is a need to concentrate on the provision on arterial coverage, this information is just as important to the consumer as freeway information.
	Fund an aggressive and sustained marketing campaign. These are a traditionally an underused tool in the promotion of ATIS products, yet they are two of the biggest factors in determining whether or not clients become regular users.
	Employ staff or contract out technical project managers who can advise on advances in communications and related industries.
Benefits & Costs	

REPORT TITLE: **Advanced Traveler Information Service (ATIS): Who are the Customers?**	**DATE:** **January 2000**
REPORT AUTHOR (S): **J. Lappin**	**REF. NO. 14**

Lessons Learned	Customer demand for ATIS traffic services is based on: • The regional traffic context; • The quality of the ATIS services; • The individual trip characteristics; and, • The characteristics of the traveler.
	Partnerships with private sectors should be pursued to provide value added services, improved dissemination, marketing, etc.
	The user stakeholders will only deem the services provided useful if the information provided is of a high quality and is reliable.
	It is important to tailor the products of the 511 system to meet the changing expectations of consumers. To identify these expectations, periodic focus groups of local travellers would be beneficial. Tracked trends over time to anticipate needs. Create a business environment for advance services to prosper to when the market is ready to pay for those services.
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	Employ staff or contract out technical project managers who can advise on advances in communications and related industries.
Benefits & Costs	

REPORT TITLE: **Developing Traveller Information Systems Using the National ITS Architecture**	**DATE:** **August 1998**
REPORT AUTHOR (S): **Mitretek Systems on the behalf of the Federal Highway Administration ITS Joint Program Office**	**REF. NO. 15**

Lessons Learned	
1. Regional Coordination	Include all stakeholders in regional planning and project development phases.
	Determine interest of private parties for participation in a traveler information system venture. To ensure fairness, a Request for Information (RFI) to determine interest may be needed. The RFI must query interest, resources, experience and skills covering both the capital acquisition and the operation and maintenance phases. It should solicit recommendations on characteristics of a possible public-private partnership and should provide reasonable found on the parameters and expectations of any public-private partnership for the traveler information system..
	Identify an ITS advocate in every key agency as a means to facilitate inter-agency cooperation.
	Foster inter-jurisdictional, inter-agency, and inter-departmental cooperation.
	Try to identify representatives for each major stakeholder at three levels, policy, management, and technical, to participate in those levels of stakeholder participation. Policy level is needed for top level steering. The management and technical representatives are needed to participate in regional planning with a decision making body and technical support committees.
	Address information-sharing issues up front. Partners' roles and responsibilities need to be clearly defined early in the planning stage.
	The private sector generally needs to see a good potential for a reasonable return on its investment in order to make a long-term commitment.
	Keep open lines of communication between all stakeholders during every project phase.
	Involve police and other public safety agencies early in the planning/development process.
	Visit traveler information centers in other metropolitan regions to learn about related benefits. Use this information gathered to be buy-in from agency decision makers and other stakeholders..

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	Perform public outreach. Emphasize the cost savings, travel timesaving and safety improvements benefits of the system to the public. Consider outreach activities to educate individuals/agencies on becoming informed consumers of ITS and the benefits that they can bring to transportation systems in their region by means of training courses, awareness seminars, workshops, one-on-one support, experience sharing, guidance documentation and conference/committee meeting presentations.
	Prime considerations when deciding to deploy ITS, such as ATIS, include the competitive advantage it offers in attracting new business, expanding current business, or improving the quality of life of a region's constituents.
	Share the cost of ITS project staff, facilities, and equipment with other ITS stakeholders in your region. The term for this is "Resource Sharing". The potential benefits to all ITS transportation stakeholders will help encourage this resource sharing.
	Consider the time required to get a Memorandum of Understanding (MOU) developed and signed by all major stakeholders in any planning. Legal issues take a considerable amount of time to resolve.
2. Program Development Team	Involve the public and private stakeholders throughout the program development process, although staff should become more technical or more detail oriented as work progresses from concept planning to implementation phases.
	Form separate, but coordinated groups within the Program Development Team to address planning, design, procurement, and operations.
	Carefully define group charters and objectives to heighten productivity and speed results.
	Share project successes and credit for successes.
3. Program Manager	Ensure continuity of project management.
	Select a well-qualified program manager.
4. Staffing the Program	Address staffing issues early. Prior to the start of an ITS project, ensure that adequate, technically qualified staff are available to works with the project manager.
	Involve a responsible point of contact in the personnel organization that governs hiring as early as possible.

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	Do not underestimate the time requirement involved in the training of public agency staff.
	Involve operations and maintenance personnel in all phases of ITS project planning and deployment so that their roles, responsibilities, and needs are accurately defined and addressed.
	Involve procurement personnel at the beginning of the project. Procurement is as important a phase of the project development as the design and build phases.
	Involve legal staffs early in the process to prevent fatal flaws such as non-conformance with federal state, and local laws and regulations.
5. Identification of Needs or Problems	Get ITS buy-in early from upper management (agency decision makers) and mid-level management (project implementers). In particular apprise them of the needs or problems being addressed.
	Gaining consensus on the project definition, user, user needs, and user requirement can take several passes.
	Consider use of focus groups to help determine users, user needs, and technologies involved.
	Do not rush the project requirements phase. A one-month delay early in the project (during the requirements definition phase) may prevent a one-year or several year delay, resulting from incomplete requirements and specifications in the future.
	Gaining consensus on the project definition, users, user needs, and user requirements can take several passes. Allow the engineering consultant or support contractor at least two reviews (one draft, one final) to develop the user requirements/equipment specifications. Allow sufficient time for a comprehensive review between draft and final versions of specifications and requirements.
6. Identification of Solutions	One method recognized as a way for agencies to get over resistance towards ITS technologies was to provide upper management with real examples of successfully deployed ITS projects. It is critical that initial ITS project deployments be those that will provide immediate, visible, and significant benefits. Failure to deploy ITS projects that provide these types of benefits will greatly increase the challenges of securing funds for future ITS projects.

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	Outreach to the public was also identified by another agency as an important component of the program. The agency indicated that emphasizing cost related benefits of ITS projects is the best way to win public support.
	Complex projects require flexibility by all parties, and participation by all parties is critical to success.
	Consider operational and maintenance impact as well as capital cost and potential benefits
	In developing traveler information systems, one of the most important areas to focus on is Consumer Acceptance, involving the following factors:
	• Traveler information must be timely, accurate, relevant, and reliable.
	• Most traveler information consumers would be unwilling to directly pay for traveller information alone, unless it offers a significant improvement over the traveler information that would be available free-of-charge.
	• Many TIS consumers find traveler information an attractive feature when it is bundled with for-pay services (e.g. stock quotes, weather, sports scores, yellow-pages information, etc.)
	• Travelers are generally more interested in having traveler information for long-distance trips or for travel in unfamiliar areas.
	• Travelers are generally less interested in having traveler information for local or familiar trips. However, travelers are interested in avoiding any extended delays or other inconveniences.
	• Travelers are generally more interested in having en-route information than in having pre-trip information.
7. Planning and Design of the Solution	Have a firm idea of what you want the system to do in terms of needs, expectations, functionally, performance, capabilities. Examine previously deployed systems to help identify needs relative to local or regional problems. Knowing exactly what the system should do will also strengthen the justification for the system when it is presented to decision-makers for approval. Solicit input from all project stakeholders in order to obtain multiple views/various perspectives of the system. Take adequate time to design the system so that it fully meets the needs of the consumer.

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	Plan for an open, modular system
	Be realistic about your capabilities and get help accordingly. Use integrators and consultants to assist in the project.
	Conduct a communications study to make sure that future requirements are accommodated by the system design) i.e. number and type of devices: computers, cameras, etc.)
	Do not rush the project planning, requirements, and specification phases. To avoid delays during the development and installation phases, define the project requirements clearly. Also design to the needs that have been defined. Always keep the needs that have been defined and approved through the planning phases sharply in focus. Initial traveler information system deployment should address services and products appealing to the largest group of consumer and must provide realizable benefits to those consumers. Initial failures resulting in rejection and criticism by consumer will be hard to overcome.
8. Evaluation Design	Demonstrable benefits are critical to participants in order to demonstrate their return-on-investment for both Public and Private Partners. This could be essential for obtaining support for future related projects. Measurable benefits to the traveler are necessary for growing the traveler information customer base. In most cases, the customer perception of being benefited through avoidance of significant delay may be valuable, but difficult to quantify.
	The evaluation process should be initiate during the project planning phase. Evaluation contractors should be brought on-board early.
	In order to be effective, the evaluator must be given the opportunity to influence the system design so that the system will accommodate the measurements needed to conduct the requisite analysis. Benefits analysis usually must involve before and after data.
	The evaluator should be under direct contract to the lead agency or partner.
	When reasonable, ensure that national goals as well as local goals and objectives are evaluated.
	Avoid closed proprietary systems (whenever possible). Instead, use an open systems architecture to: promote interoperability, promote modularity, support one product from multiple vendors, accommodate diverse geographic settings and variations in local environments.

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	Use standards (whenever possible) to promote interoperability and prevent obsolescence.
	Use the National ITS Architecture as a design framework to: coordinate design with other ITS systems, accommodate future applications/interfaces between TIS and other systems/subsystems.
	Define functional requirements and performance standards for all systems components.
	Vendors should furnish all of the necessary system documentation including detailed functional requirements; system design report; system configuration diagrams; interface specifications; product/hardware/software documentation; test specifications and test procedures; and operator manuals, user guidelines, and Standard Operating Procedures (SOPs).
	Build only what you can realistically maintain. During the design and build phases of the project, make sure you keep an eye on realistic maintainability/reliability expectations.
9. Funding, Procurement and Implementation – The Schedule	Do not adopt an optimistic schedule.
	Define frequent and realistic milestones to use in assessing progress against the schedule.
	Unambiguously define all milestones.
	Define each milestone so that teaching it is clearly identifiable.
	Make reasonable efforts to keep the project on schedule. However, never cut schedules for reviews of design documentation, for preliminary and final design review presentations by the contractor, for system integration, or for thorough testing, in the factor, at the first field site and at every field site. When needed to preserve these critical activities, extend the schedule.

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10. Funding the Program	Commitment of capital funding as well as operations and maintenance funding from private sources, through public/private partnerships or other arrangements, thus leveraging the public funds, further strengthens any ITS program insofar as competing for funds from public sources. Also, the higher the degree of public/private partner investment, the more likely the project will be included in the capital improvements program.
	Share your funding experiences for deign, construction, operations and maintenance.
	Maintain a realistic assessment of funding.
11. Agency/Contractor Interaction and Other Issues	Don't simply take a vendor's or contractor's advice or word on capabilities of a system or piece of equipment. Ask them: "Has the (system/software/equipment) been used in a traveler information system application before? Has the (system/software/equipment) been used to perform the (task/function) before?" Be sure to obtain references as to where these applications were and what agencies were involved and then talk to those references.
	Make sure the company from which you are purchasing services or equipment from is financially sound. Check business and technical references. Talk to others in the field who have done what you are planning to do.
	Maintain focus on the system's final configuration definition. Keep the system developer's focus on the requirements of the final product, not just the next deliverable.
	Take the time needed to review important project requirements. For larger projects, allow the contractor/equipment vendors at least two passes (one draft, one final) to develop the user requirements and the equipment and software specification. For smaller projects, one pass may suffice. Arrange in the contractor's work statement for audio/visual presentations of the draft and final designs to agency staff, plus other agency representatives and project stakeholders. This is helpful in identifying requirements misinterpretations.
	Allow sufficient time for a comprehensive review of draft and final versions of test specifications and test procedures.
	When significant amounts of software development are involved, arrange to have one or two key staff and expert software engineer representatives sit in on the contractor's internal software design walk through, since these cover how the system will work in some detail and may highlight misinterpretations.

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12. Managing the Program	Use the design/build process to get systems operating early whenever appropriate. However, be cautious about using a design/building process that involves any significant amount of development.
	Manage project and system expectations. They need to be realistic and achievable with available funding, time (schedule), and staffing.
	Emphasize consensus and coordination as keys to project success.
	Exceeding the costs estimated for software development is highly probable and a major problem in the industry. Cost overruns are common in ITS projects. Agencies need to be prepared for these overruns by developing contingency plans. Contractors can only base realistic software development cost on accurate, detailed requirements specifications.
	Schedule project activities (e.g. meetings, teleconferences, etc.) with a great deal of flexibility to ensure stakeholder participation/consensus.
	Document control is very important. Track and control project documentation.
13. System Integration and Testing	Integration of existing/working technologies is hard enough without introducing new and untried technologies.
	Systems can be built incrementally, however, any necessary communications equipment needs to be in place for integration with prior and future increments.
	Use trained agency staff in hands-on roles for operational and maintenance testing, particularly final development test in the factory and final acceptance test at the few field sites.
14. Operations and Maintenance	Involve operations and maintenance personnel in requirements reviews, specification reviews and in preliminary and final system design reviews to keep them involved and to get their buy-in to the system.
	Secure/budget adequate operations and maintenance resources (e.g. staff, funding, time/schedule, etc.).
	Perform early operation and maintenance training for personnel. Use those trained staff in hands-on roles for operational and maintenance testing, particularly in final acceptance tests. This is an important training experience for those staff.

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15. Procuring Telecommunications	An important consideration is the procurement of the appropriate telecommunications services for the TIS.
	A new telecommunications system can be the highest cost item in an ITS deployment project. A telecommunications analysis including the three steps below should support telecommunications decisions: requirements definition, definition of network options, cost analysis.
	The requirements definition step is the most important. Good decisions can only be made if care is taken during this step of the analysis. The product of requirements definition is a reasonable estimate of how much information needs to be moved from point to point throughout the system in its future fully deployed state. To do this, a rigorous estimation process that focuses on needs rather than possibilities must be followed. This must be supported by an understanding of the types of devices to be installed, where they will be, how many there will be, message sizes and frequencies, etc. Also, the regions plans for locating and communication amount transportation management centers must be understood. Perhaps the most fundamental questions in requirements definition is whether the telecommunications system will serve the needs of a single agency, multiple transportation agencies in a region, or multiple government agencies with a jurisdiction or region.
	The definition of network options step involves defining different telecommunications network structures or architectures. Fro example, the information that needs to be passed back and forth will be very different if processing is distributed rather than centralized. Within the contact of these different network structures or architectures, ownership and leasing options should be explored. Thinking broadly in terms of providing a telecommunications service rather than building a telecommunications infrastructure will open the door to consideration of a number of different options, including combinations of leased and owned infrastructure.
	In the final cost analysis step, the cost implications of the different alternatives are detailed and compared. Ownership options involve higher installation and maintenance costs, which must be compared against the terms of the available leasing arrangements. Short term leasing deals, on the order of from five to ten years, may enable agencies to possibly obtain more favourable terms in the future, and also enable agencies to take better advantage of technological advances than they typically would be able to with a publicly owned system or longer term leasing deal.
Benefits & Costs	

REPORT TITLE: **What Have We Learned About Advanced Traveler Information Systems and Customer Satisfaction?**	**DATE:** 2000
REPORT AUTHOR (S): **J. Lappin (EG&G Technical Services for John A. Volpe National Systems Center)**	**REF. NO. 16**

Lessons Learned	ATIS customer identified four primary benefits: save time, avoided congestion, reduced stress, avoided unsafe conditions.
	ATIS users seek:
	• Camera views.
	• Detailed information on incidents.
	• Direct measures of speed by highway segment.
	• Travel time between user selected origins and destinations.
	• Coverage of all major freeways and arterials.
	• En-route access to good traffic information.
	ATIS transit customers want real time information for both pre trip and en-route, and a good quality of user interface. ATIS transit customers site the following benefits: reduced stress, improved satisfaction regarding decision to take transit, and a greater control over time travel decisions.
	Almost ATIS customers are employed commuters with the greatest use of ATIS occurring during peak hours.
	Most ATIS customers are male, however, amongst transit customers use rate by gender is even. The study noted that there is a large portion of the population who prefer pre trip information provided over relatively low tech means of dissemination. These users are characterized as having a low acceptance in comfort level with technology such as the internet and web based tools. This group is older and includes slightly more males than females. This group can be expected to continue to demand high quality information services via low tech media.
	Qualitative market research conducted in 1996 by the National ITS Program found that motorists desire the following characteristics of traveller information:

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	• Accuracy.
	• Timeliness.
	• Reliability.
	• Cost (capital and operating).
	• Degree of decision guidance and personalization.
	• Convenience (ease of access and speed).
	• Safety (of operation).
	A survey of WSDOT customers, considered to be advanced ATIS users, identified the following advanced features as desirable in a mature ATIS
	• Information concerning ramp metering and shortest possible queue length.
	• Having the system identify whether conditions are getting worse or improving at any one time.
	• Predictive information identifying for what can be expected for certain time of the day, days of the week, or weather conditions.
	• Flashing major events on a conditions map would heighten user awareness of upcoming planned events. For example, users in Seattle a flashing kingdom icon when evenings when there is an event at that venue.
	• Information concerning parking availability, potentially coupled with advanced parking reservation and payment system.
	Transit users indicated the following priorities for ATIS:
	• More sophisticated and detailed web interfaces.
	• Point to point itineraries on websites.

REPORT TITLE: **What Have We Learned About Advanced Traveler Information Systems and Customer Satisfaction?**	**DATE:** **2000**
REPORT AUTHOR (S): **J. Lappin (EG&G Technical Services for John A. Volpe National Systems Center)**	**REF. NO. 16**

	• Point to point itineraries for multi model trips on websites.
	• Recommended trip times and routes for fastest travel on the websites.
	• Detailed maps of routes with stops and transfer locations.
	• Secure online bus pass purchases for websites.
Benefits & Costs	

REPORT TITLE: **ATIS U.S. Business Models Review**	**DATE:** **November 15, 2001**
REPORT AUTHOR (S): **Rick Schuman and Eli Sherer, PBS&J**	**REF. NO. 17**

Lessons Learned	Self-sustaining national ATIS ISP model has yet to be demonstrated in the U.S.
	Lack of quality data is still most important issue.
	The model of aggregating data at a national level for data dissemination has been clearly demonstrated. Examples include OnStar in the telematics market, Yahoo and MapQuest in the internet portal market and AT&T Wireless/TellMe in the audio portal market.
	Viable markets for ATIS include broadcast, fee-for-service and national wholesaling.
	Fee-based direct to consumer services have yet to prove viable.
	Advertising-driven services have yet to prove viable as a primary revenue source for ATIS.
	Consumers like and will use ATIS information.
	Travel time reliability is principal benefit of ATIS to users.
	Public funding or facilities, especially with regard to data collection, is essential to a successful ATIS implementation.
	The public sector may have the opportunity to sell its own wares, as long as the data being sold is of sufficient quality and is on a level that the private sector cannot gather similar data on their own.
	Revenue generation from ATIS services, both wholesale and to the individual, has not proven successfully that this revenue can wholly support an ATIS service.
	If there are specific traveler information services public agencies in a region or state wish to provide to their traveling public, they should be prepared to underwrite most or all of the cost.
Benefits & Costs	

REPORT TITLE: **511 Case Studies – Utah CommuterLink**	**DATE:** **December 2001**
REPORT AUTHOR (S): **R. Schuman of PBS&J**	**REF. NO. 18**

Lessons Learned	All calls from local carriers are routed via a toll free number.
	Utah opted for a fully outsourced 511 service. TellMe was selected and charges for there operation on a per minutes basis.
	Local implementers can learn and benefit from participation in broader 511-development coalition.
	Utah had a positive experience with its internet audio portal and use of VXML.
	The use of existing contract helps to move the process along quickly where possible.
	Implementers need a clear and complete understanding of the costs particularly those related to the telecommunications area.
Benefits & Costs	Utah DOT has purchased 6,000,000 minutes annually for three years at 8 cents per minute. There is no discount for time purchased beyond this call volume.

REPORT TITLE: **511 Case Studies – Shenandoah Valley, Virginia**	**DATE:** **December 2001**
REPORT AUTHOR (S): **R. Schuman of PBS&J**	**REF. NO. 19**

Lessons Learned	Customer feedback is crucial. Focus groups are useful to improve content and operation.
	Used a telecommunications expert in the design of the system and for coordination with other carriers regarding call routing.
	It is important to remain flexible with the system design. The system will evolve over time as needs emerge, partners take interest, legislation changes, technology develops, etc.
Benefits & Costs	

REPORT TITLE: **Minnesota 511 Case Study**	**DATE:** **July, 2001**
REPORT AUTHOR (S): **Rich Schuman and Ely Scherer of PBS&J**	**REF. NO. 20**

Lessons Learned	Customer feedback indicates that lack of coverage is a major deterrent to use for the system for the system.
	Customer feedback indicated that a requirement for route and milepost identification was difficult to use. A positive change to the system now allows route or route and milepost queries.
	Minnesota has developed a permanent ATIS policy committee that advises on the development and coordination of standards, and coordinates with other 511 developments.
	Minnesota places high value on fostering stakeholder input.
	It is important to develop uniform delivery and input standards.
	It is important to keep the menu tree simple even as more information becomes available on the system.
	It is important to maintain data quality and reliability.
	Use focus groups to determine the acceptability, the data, and the system structure for the user.
	Maintain incremental expansions of the system and do not overshoot the stated goals.
	Involve technical staff early to ensure by in and obtain valuable operating inputs.
	Develop firewall policies for access.
	Understand that 24 x 7 operation requires 24 x 7 support.
	Data entry consistency is a must, data dictionaries help, but application must be consistent. Agreements help to ensure this, but expect resistance from some operating stakeholders.
	Cooperation of telecommunication carriers is absolutely necessary.
	Be prepared to change and upgrade, as stakeholders become aware of the system there will be new requests for involvement. You cannot design the system to suit everyone's needs perfectly from the beginning.

REPORT TITLE: **Minnesota 511 Case Study**	**DATE:** **July, 2001**
REPORT AUTHOR (S): **Rich Schuman and Ely Scherer of PBS&J**	**REF. NO. 20**

	Look for new business models. New data content may require new funding sources. New funding is often a policy issue, but an alternate approach may be to reduce costs or change the service.
Benefits & Costs	

REPORT TITLE: **511 Travel Information Systems Status Report**	**DATE:** **February 2003**
REPORT AUTHOR (S): **Ziegler (Washington State DOT)**	**REF. NO. 21**
Lessons Learned	November call volume for 2002 was 331, 000 calls with an average call length of 1 minutes and 22 seconds.
	20% of daily calls are from the busiest hour of the day.
	Washington DOT (WSDOT) notes that for the 24 x 7 511 service to be effective its supporting data systems must be support 24 x 7. WSDOT had some difficulty with their Conditioning Acquisition Reporting System not being supported overnight or weekends.
	WSDOT marketing campaign to include radio, newspaper, outdoor signing, and HAR advertising. Use of the 511 logo will appear on all press releases, incident response team brochures, highway maps, and travel areas on the web. 511 information will be posted and distributed at all rest areas. Internet information will be available on how the 511 system works. 511 magnets will be distributed at fairs, auto shows, conventions, etc.
Benefits & Costs	

REPORT TITLE: **511 Case Studies - Kentucky**	**DATE:** **November 2000**
REPORT AUTHOR (S): **Rick Schuman, PBS&J**	**REF. NO. 22**
Lessons Learned	Breaking route segments up by county and then segments within the county was intuitive for customers.
	Snow and emergency conditions caused extreme peaking (e.g. 12,000 calls per hour) and the system must be sized appropriately.
	Wireless call location was accomplished through nearest base station pickup. Erroneous locations were rectified through call transfers.
	Prior to the 511 assignment Kentucky had many ongoing contracts for telephone information. There were benefits accrued by transferring to these lines from 511 in the short term during which existing contracts were exhausted.
	There are three important telecommunication negotiations to pursue early in the development of the 511 system; landline, wireless, payphone carriers.
	FCC orders encouraged wireless carriers to develop agreements that would waive roaming charges. Kentucky is trying to get these carriers to waive airtime charges as well.
	Other jurisdictions have simply taken the approach that a 511 call should be no more expensive than a regular call (not less expensive as Kentucky is pursuing).
	With over 300 payphone operators, Kentucky decided it would be too difficult in the short term to strike agreement with each carrier.
	Implementers should contact and use state telecommunication associations, and if none, use the largest operator to gain leverage over the others.
	Implementers should make an early determination of regulatory issues. Speak informally and often with the regulatory body.
	Implementers should consider human factors in the development of menus and messages. For example, they should not be too long, they should be simple to use, etc. Also, they should be developed to keep the data entry process as simple as possible.
Benefits & Costs	Costs of calls, routing, switching are small relative to the costs of gathering and fusing data.

REPORT TITLE: **511 Case Studies - Arizona**	**DATE:** **February 2001**
REPORT AUTHOR (S): **Rick Schuman (PBS&J)**	**REF. NO. 23**

Lessons Learned	ADOT has benefited from a distributed (decentralized) data entry process involving the DOT, local municipalities, 911 operators, construction project managers, etc. A standard data entry template is employed. It is important to incorporate a requirement for the most recent updates to any software used as part of the contract. Otherwise, account for the costs of these upgrades in the operating budget. Use of the system was spurred by the introduction of the 3-digit dialling. Use of the system increases on holiday weekends and in times of inclement weather. The system experiences a 50/50 urban rural split in usage. Customer feedback suggests major annoyances are messages that are too long (should instead break road sections down into smaller areas with shorter messages). Customer feedback suggests that menu structure must be simple. Also, customers have indicated annoyance with busy signals.
	The service is provided free to callers.
	A cost-effective means of redirecting calls is needed.
	Early coordination with the telecommunications providers is a good idea. It keeps them informed, and they may have valuable inputs regarding process and technical requirements.
	It is important to identify a cost effective means of call routing in coordination with Telecoms providers.
	It is important to identify early a funding mechanism for the system.
	Individual implementers must determine the appropriate size for the system to meet the anticipated demand.
	Implementers should develop a task force of multi agency representatives to form a common vision for the system.
	Implementers should talk with technical staff to make sure that the system is operable and meets operating requirements.
	Implementers should carefully review and understand all the cost associated with implementing a system including, licensing, expansion costs, upgrades to software, maintenance, etc.

REPORT TITLE: **511 Case Studies - Arizona**	**DATE:** **February 2001**
REPORT AUTHOR (S): **Rick Schuman (PBS&J)**	**REF. NO. 23**
	Where ever possible follow standard guidelines for the development of a menu tree.

REPORT TITLE: **Intelligent Transportation Systems Field Operational Test Cross-Cutting Study: Advanced Traveler Information Systems**	**DATE:** **September 1998**
REPORT AUTHOR (S): **Booz-Allen and Hamilton (Highway and Vehicle Technology Group) prepared for USDOT Federal Highway Administration**	**REF. NO. 24**

Lessons Learned	Legal issues arising from pre trip ATIS information include copyright issues and proprietary issues, licensing agreements, confidentiality agreements. Also, safety in using systems while driving is commonly cited as a concern. Finally, use of publicly collected traffic information when distributed by private in trusts maybe of concern.
	Another significant legal issue is the matter of tort liability for distributed information as either false inaccurate or unreliable. In this instance Trav Info (San Francisco, pre 511 system) protected itself by including disclaimers of liability and a warranty in the terms and conditions of a registered participant of the agreement.
	Another concern for Caltrans was the issue of the publicly funded traffic information packaged for reselling for profit by commercial agencies. This issue was addressed providing a certain amount of traffic information for free through the state Trav info traffic advisory telephone service (again pre 511) and that the private sector would provide added value including potentially privately collected data and the development of specialized consumer products prior to resale.
	The potential positive and negative impacts of using partnership approach compared to a traditional contracting arrangement include:
	• Creativity and flexibility.
	• The ability to share information and resources.
	• The ability to share risks.
	• The ability to test leading edge technology; and
	• The funding potential associated with private sector contributions.
	The negative impacts included:
	• The inability to control the private vendors and enforce their end of the agreement.

REPORT TITLE: **Intelligent Transportation Systems Field Operational Test Cross-Cutting Study: Advanced Traveler Information Systems**	**DATE:** **September 1998**
REPORT AUTHOR (S): **Booz-Allen and Hamilton (Highway and Vehicle Technology Group) prepared for USDOT Federal Highway Administration**	**REF. NO. 24**

	• The lack of profit for private vendors.
	• The difficulties associated with team decision making; and
	• The length of time involved in developing and executing agreements.

REPORT TITLE: **ATIS Practices in Europe and North America: A Report on Comparative Analysis**	**DATE:** **October 31, 2002**
REPORT AUTHOR (S): **Ken Chen**	**REF. NO. 25**
Lessons Learned	There are several similarities in ATIS services and business models between North America and Europe as follows:
	• Both Europe and North America need to have a complete information value chain for delivery of ATIS services.
	• Broadcast traveler information supported by advertisement has been proven to be viable.
	• The public objectives in ATIS (safety and traffic management) are the same in both continents.
	• Public sector agencies should be prepared to underwrite all costs of specific information services they wish to provide.
	The report also identifies several prominent differences, such as:
	• Compared to Europe, North American ATIS services put much greater emphasis on integration of traffic information across jurisdictions than across modes (e.g., between mass transit and automobile traffic).
	• The fundamental and important differences between Europe and North America related to ATIS are differences in culture, land-use, and demography.

REPORT TITLE: **ITS Impacts Assessment for Seattle MMDI Evaluation: Modeling Methodology and Results**	**DATE:** **June 1999**
REPORT AUTHOR (S): **J. Clemons, et al.**	**REF. NO. 26**

Lessons Learned	ARTIMIS is a transportation management and traveler information system serving northern Kentucky and Cincinnati. Telephone ATIS is one component of the system. This study reported on the results of a customer satisfaction survey
	Users rated the service very high in accuracy and ease of use.
	More than 99% of those surveyed said they benefited from the system by avoiding traffic congestion, saving time, reducing frustration, and arriving at destinations on time.
	65% of respondents indicated they would be willing to pay for the service.

REPORT TITLE: **Resource 511** (www.deploy511.org	DATE: **March 23, 2004**
REPORT AUTHOR (S): **511 Deployment Coalition in the US**	**REF. NO. 27**

Lessons Learned	The following statistics were obtained from this site:
	• During the month of January 2004, a total of 1,825,831 calls were made to 511 systems in the US. This is the second month in a row that calls nationwide exceeded one million and a new nationwide record
	• Call made in January 2004 represented a 21% increase from December 2003
	• Average call length for January 2004 was 1 minute and 46 seconds for a total of over 3,218,000 minutes of call time
	• In January, 511 was available to almost 57 million Americans (19.4%).
	• Almost 14.75 million calls have been placed to 511 to date.

REPORT TITLE: **ITS America's 511 Market Research** http://www.deploy511.org/docs/brochurefinal.pdf	**DATE:** **March 24, 2004**
REPORT AUTHOR (S): **511 Deployment Coalition in the US**	**REF. NO. 28**

Lessons Learned	This report describes the results of a survey of travelers conducted by Gallup Organization in late 2001 on behalf of ITS America:
	Key findings:
	All respondents were aware of the availability of traffic reports such as those provided via radio or TV.
	Approximately 50% of respondents were aware of specialized traveler information systems. Note that there are over 300 individual telephone numbers used throughout the US to provide traffic and traveler information.
	Only about 10% of respondents were aware of 511. Note that at the time of the survey, 511 was operational in only 4 states/regions in the US.
	Respondents wanted the ATIS data to be updated every 10 to 15 minutes.
	Commercial operators are more likely to be willing to pay for the service than non-commercial travelers.

REPORT TITLE: **Detroit Michigan 511 Case Study**	**DATE:** **February 2001**
REPORT AUTHOR (S): **D. Fierro & P. Shortal (SmartRoute Systems)**	**REF: NO. 29**
Lessons Learned	It is important to identify a clear lead agency for the development of a 511 system. The agency must be committed and have the authority to carry implementation forward.
	The implementer should work very closely with the regulatory body to ensure there are no hurdles to implementation.
	Implementers should be cognisant that the private sector and manufacturers (e.g. AAA, vehicle manufacturers) may play a key role as there systems grow and should compliment (not compete with 511)
Benefits & Costs	3 digit dialling will be key as area codes proliferate.

REPORT TITLE: **Corroborating Qualitative Benefits of On Line ATIS with Modeling**	**DATE:** **March 2003**
REPORT AUTHOR (S): **A. Toppen, Dr. K. Wunderlich (Mitretek Systems) in cooperation with Volpe National Transportation Systems Centre prepared for FHWA.**	**REF. NO. 30**

Lessons Learned	Informed, mature users of website traffic data believe that it helps save them time by avoiding congestion, and improved reliability of their arrival time. Also they experienced less congestion due to delay.
	Modelled users of the Travel Advisory News Network (TANN) and SmarTraveler websites improved on time reliability relative to simulated commuters, and this is consistent with actual user perception.
	There is more on time reliability with personalized trip planning (based on route travel times) than colour coded mapping.
	Expected travel time for a required arrival time (and thus a departure time) is considered the most beneficial product, even more than the desirable path.
	While there is a greater variability in the degree of benefits realized, those making long trips in peek periods benefit the most from online ATIS.
	Taking into consideration the quality of information presented, congestion map benefits compare favourably to those of a moderately accurate online personalized travel time service.
Benefits & Costs	

Appendix C

Survey of Canadian ATIS Stakeholder User Needs and Opportunities (October 2004)

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CHAPTER 1: INTRODUCTION

A project entitled "511 Readiness in Canada" was initiated by Transport Canada to determine the current state of advanced traveller information systems (ATIS) across the country. As part of this project, the University of Waterloo, in conjunction with IBI Group and Transport Canada, developed a web-based survey questionnaire in both French and English. A list of candidate survey respondents was developed by IBI Group with input from Transport Canada and other stakeholders. The candidate survey respondent list consisted of individuals representing 42 stakeholder organizations across the country. Stakeholders included provincial/territorial departments of transportation, cities, transit authorities, and private sector transportation service providers. Each person on the candidate survey respondent list was contacted by telephone to obtain consent to participate in the survey. After obtaining a candidate respondent's consent, an email was sent introducing the survey and providing links to the survey web site.

The web-based survey was launched on July 5, 2004. Responses were solicited until September 24, 2004.

A summary of the number of responses is provided below:

Number of intended survey respondents:	42
Number that declined to participate:	2
Number that could not be contacted:	2
Number that committed to participate:	38
Number that participated in survey:	32
Number that committed but did not participate:	6

Survey respondents represented provincial/territorial agencies (13), city/municipal agencies (13), transit agencies (5), and private sector transportation service providers (1).

Participating organizations	
Provincial/ Territorial (13)	Newfoundland Dept. of Transportation and Works
	PEI Dept. of Transportation and Public Works
	Nova Scotia Dept. of Transportation and Public Works
	New Brunswick Dept. of Transportation
	Ministère des Transports du Québec
	Ontario Ministry of Transportation
	Manitoba Transportation and Government Services
	Saskatchewan Dept. of Highways and Transportation
	Alberta Transportation
	British Columbia Dept. of Transportation
	Government of Nunavut – Economic Development and Transportation
	Government of the Northwest Territories – Dept. of Transportation
	Government of Yukon – Dept. of Highways and Public Works
City/Regional Municipality (13)	Halifax Regional Municipality
	Fredericton
	Quebec City
	Ville de Montréal
	Ottawa
	Toronto
	Hamilton
	Winnipeg
	Saskatoon
	Calgary
	Edmonton
	Vancouver
	Translink (Greater Vancouver)
Transit (5)	Société de transport de Montréal
	Toronto Transit Commission
	GO Transit
	Calgary Transit
	Edmonton Transit
Other (1)	Greyhound Canada Transportation Inc.

CHAPTER 2: SURVEY RESULTS

In each of the following sections, the associated survey question is provided followed by the survey results. Where appropriate, the survey results are interpreted.

Question 1

Do you believe there is a need for your organization to provide telephone-based or web-based traveller information services?

Response	#	%
No	0	0%
Yes	32	100%
Total	32	

It is clear from these results that all of the organizations participating in the survey believe there is a need to provide telephone-based or web-based traveller information.

Question 2

Is it part of your organization's mandate to provide telephone-based or web-based traveller information services?

Response	#	%
No	7	22%
Yes	25	78%
Total	32	

The 7 respondents who answered "No" to this question represented 3 cities and 4 provincial/territorial departments of transportation. It is not clear how these responses should be interpreted. A "No" response could indicate that the organization does not currently have a mandate to provide traveller information or that it does not have the mandate to provide traveller information via the specific dissemination methods of telephone or web. It would be surprising if 22% of respondents did not view the provision of traveller information as a mandate of their organization. Interestingly, several of the respondents who answered "No" to this question are known to provide some form of traveller information (e.g., all four provincial/territorial agencies).

Question 3

What do you consider to be the characteristics of a good information delivery system?

		1	2	3	4	5		
		Not Important				Very Important	Average	# Responses
a	Ubiquitous Information	0	0	7	14	11	4.1	32
b	Ease of Access / Use	0	0	0	4	28	4.9	32
c	Provision of General Information	0	2	8	10	12	4.0	32
d	Provision of Real-time Information	0	1	6	13	12	4.1	32
e	Accuracy of Information	0	0	1	3	28	4.8	32
f	Timeliness of Information	0	1	1	10	20	4.5	32
g	Services for People with Disabilities	0	1	12	9	10	3.9	32
h	Multilingual Services	5	3	11	6	7	3.2	32

Respondents indicated that all of characteristics listed above (with the exception of multilingual services) are quite important for a good traveller information delivery system. The greater variability in level of importance attributed to multilingual services reflects the variability across the country of the need for multilingual services.

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Question 4

What do you consider to be the primary advantages of facilitating access to consolidated traffic information?

		1	2	3	4	5		
		Not Important				Very Important	Average	# Responses
a	Public safety	0	6	8	8	10	3.7	32
b	Network efficiency	0	3	6	14	9	3.9	32
c	Relief to existing call centres	5	10	9	5	2	2.6	31
d	Provides quality control measures	2	9	12	5	2	2.9	30
e	'One stop shopping' for customers	1	1	6	13	11	4.0	32
f	Public relations tool	1	4	12	10	4	3.4	31
g	Maximizing utility of other related investments (e.g. ATMS)	0	4	10	11	4	3.5	29

Results indicate that the primary advantage to providing consolidated traffic information is the ability to provide travellers with 'one stop shopping'. Other advantages with marginally lower average importance include network efficiency, public safety, and opportunities to maximize investments in other areas such at ATMS.

Question 5

How would you characterize the change in the public's need for traveller information?

Code	Response	#	%
1	Significant Decrease	0	0%
2	Decrease	0	0%
3	No Change	2	6%
4	Increase	19	59%
5	Significant Increase	11	34%
	Total	32	
	Average	4.3	

Ninety four percent of respondents indicated that there is an increase or significant increase in the public's need for traveller information.

Question 6

How would you characterize the priority / importance of public info/outreach for your organization?

Code	Response	#	%
1	Not Important	0	0%
2		0	0%
3		3	9%
4		12	38%
5	Very Important	17	53%
	Total	32	
	Average	4.4	

Ninety one percent of respondents indicated that public information/outreach was important or very important for their organizations.

Question 7

How would you characterize the importance of providing more information and easier ways to access your organization's information?

Code	Response	#	%
1	Not Important	0	0%
2		0	0%
3		0	0%
4		14	44%
5	Very Important	18	56%
	Total	32	
	Average	4.6	

All respondents indicated that it was important for their organizations to provide more traveller information and to provide easier ways to access this information.

Question 8

How would you rate your agency's public outreach?

Code	Response	#	%
1	Not Effective	0	0%
2		2	6%
3		12	38%
4		16	50%
5	Very Effective	2	6%
	Total	32	
	Average	3.6	

Only 6% of respondents indicated that their organization's current public outreach activities are very effective.

Question 9

Are there plans within the organization to deploy a telephone-based, web-based, or other ATIS?

Response	#	%
No	3	10%
Yes	28	90%
Total	31	

Ninety percent of respondents indicated that their organizations have plans to deploy ATIS. Only two provincial/territorial departments of transportation and one city agency responded that their organizations did not have plans to provide ATIS. Interestingly, all three of these organizations indicated that they believe there is a need to provide telephone-based or web-based traveller information (see Question 1).

Question 4

What do you consider to be the primary advantages of facilitating access to consolidated traffic information?

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		Not Important				Very Important	Average	# Responses
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b	Network efficiency	0	3	6	14	9	3.9	32
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2		0	0%
3		3	9%
4		12	38%
5	Very Important	17	53%
	Total	32	
	Average	4.4	

Ninety one percent of respondents indicated that public information/outreach was important or very important for their organizations.

Question 7

How would you characterize the importance of providing more information and easier ways to access your organization's information?

Code	Response	#	%
1	Not Important	0	0%
2		0	0%
3		0	0%
4		14	44%
5	Very Important	18	56%
	Total	32	
	Average	4.6	

All respondents indicated that it was important for their organizations to provide more traveller information and to provide easier ways to access this information.

Question 8

How would you rate your agency's public outreach?

Code	Response	#	%
1	Not Effective	0	0%
2		2	6%
3		12	38%
4		16	50%
5	Very Effective	2	6%
	Total	32	
	Average	3.6	

Only 6% of respondents indicated that their organization's current public outreach activities are very effective.

Question 9

Are there plans within the organization to deploy a telephone-based, web-based, or other ATIS?

Response	#	%
No	3	10%
Yes	28	90%
Total	31	

Ninety percent of respondents indicated that their organizations have plans to deploy ATIS. Only two provincial/territorial departments of transportation and one city agency responded that their organizations did not have plans to provide ATIS. Interestingly, all three of these organizations indicated that they believe there is a need to provide telephone-based or web-based traveller information (see Question 1).

Question 10

If 'yes', which forms of ATIS delivery technologies do you plan to deploy within the next 5 years:

		1	2	3	4	5		
		Definitely Not	Unlikely	Possible	Likely	Definitely Yes	Average	# Responses
a	Variable Message Signs	1	3	8	8	7	3.6	27
b	Telephone-based information	1	1	4	6	17	4.3	29
c	Web-based information	0	1	1	6	21	4.6	29
d	Highway Advisory Radio	5	12	4	2	3	2.5	26
e	Pager	4	13	6	2	1	2.3	26
f	Email	1	5	10	5	6	3.4	27
g	PDA	2	8	9	6	1	2.8	26
h	TXT messaging	2	8	12	3	1	2.7	26

Web-based information is the ATIS delivery technology having the highest average likelihood of being deployed within the next 5 years. This is followed closely by telephone-based information.

Question 11

All Agencies:
From the perspective of your agency, what *basic* features would you want to include in a 511 system?

		1	2	3	4	5		
		Not Important				Very Important	Average	# Responses
a	**Contact Information**	1	2	5	13	10	3.9	31
b	Customer feedback	1	3	6	10	11	3.9	31
c	Subscriber services	6	4	16	3	2	2.7	31
d	Trip planning	3	1	6	8	13	3.9	31
e	Agency publications, standards, forms	4	8	11	5	3	2.8	31
f	Project information	5	3	7	11	6	3.3	32
g	Graphically-oriented information using map displays and contextual icons	2	2	3	15	10	3.9	32
h	Frequently Asked Questions	2	1	10	16	3	3.5	32
i	Employment Information	12	6	8	4	1	2.2	31
j	Links to other related agencies	2	2	6	14	7	3.7	31

There was considerable variability in terms of respondents' perspectives of which basic features should be included in a 511 system. However, a graphically oriented interface, trip planning, contact information, and customer feedback were perceived as important, while employment information and agency publications were perceived as relatively unimportant.

Provincial Agencies Only:
From the perspective of your agency, what *basic* features would you want to include in a 511 system?

		1	2	3	4	5		
		Not Important				Very Important	Average	# Responses
a	**Road & weather conditions (e.g. ice or snow cover, fog, wet, etc.)**	1	0	2	0	14	4.5	17
b	Road closures / major delays	1	0	0	2	14	4.6	17
c	Construction / maintenance information	1	0	1	3	12	4.5	17
d	Travel times	1	0	5	6	4	3.8	16
e	Amber Alerts	1	0	2	5	8	4.2	16
f	Real-time congestion	4	1	3	3	5	3.3	16
g	Camera still images (web only)	2	0	4	6	5	3.7	17
h	Camera video images (web only)	5	1	6	4	1	2.7	17
i	Driver and vehicle licensing, plate renewal	7	4	2	0	3	2.3	16
j	Ferry service information	4	0	3	3	7	3.5	17
k	**CVO information**	3	0	5	3	4	3.3	15

From a provincial agency perspective, the most important features of a 511 system include road closures / major delays, road and weather information, construction and maintenance information, and amber alerts. The least important features include driver and vehicle licensing, and cameral video images.

It is worth noting that for most of the features, 17 respondents provided input. However, only 13 provincial agencies participated in the survey and all 13 responded to this question. The four additional responses were provided by other respondents.

Question 10

If 'yes', which forms of ATIS delivery technologies do you plan to deploy within the next 5 years:

		1	2	3	4	5		
		Definitely Not	Unlikely	Possible	Likely	Definitely Yes	Average	# Responses
a	Variable Message Signs	1	3	8	8	7	3.6	27
b	Telephone-based information	1	1	4	6	17	4.3	29
c	Web-based information	0	1	1	6	21	4.6	29
d	Highway Advisory Radio	5	12	4	2	3	2.5	26
e	Pager	4	13	6	2	1	2.3	26
f	Email	1	5	10	5	6	3.4	27
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d	Trip planning	3	1	6	8	13	3.9	31
e	Agency publications, standards, forms	4	8	11	5	3	2.8	31
f	Project information	5	3	7	11	6	3.3	32
g	Graphically-oriented information using map displays and contextual icons	2	2	3	15	10	3.9	32
h	Frequently Asked Questions	2	1	10	16	3	3.5	32
i	Employment Information	12	6	8	4	1	2.2	31
j	Links to other related agencies	2	2	6	14	7	3.7	31

There was considerable variability in terms of respondents' perspectives of which basic features should be included in a 511 system. However, a graphically oriented interface, trip planning, contact information, and customer feedback were perceived as important, while employment information and agency publications were perceived as relatively unimportant.

Provincial Agencies Only:
From the perspective of your agency, what *basic* features would you want to include in a 511 system?

		1	2	3	4	5		
		Not Important				Very Important	Average	# Responses
a	**Road & weather conditions (e.g. ice or snow cover, fog, wet, etc.)**	1	0	2	0	14	4.5	17
b	Road closures / major delays	1	0	0	2	14	4.6	17
c	Construction / maintenance information	1	0	1	3	12	4.5	17
d	Travel times	1	0	5	6	4	3.8	16
e	Amber Alerts	1	0	2	5	8	4.2	16
f	Real-time congestion	4	1	3	3	5	3.3	16
g	Camera still images (web only)	2	0	4	6	5	3.7	17
h	Camera video images (web only)	5	1	6	4	1	2.7	17
i	Driver and vehicle licensing, plate renewal	7	4	2	0	3	2.3	16
j	Ferry service information	4	0	3	3	7	3.5	17
k	**CVO information**	3	0	5	3	4	3.3	15

From a provincial agency perspective, the most important features of a 511 system include road closures / major delays, road and weather information, construction and maintenance information, and amber alerts. The least important features include driver and vehicle licensing, and cameral video images.

It is worth noting that for most of the features, 17 respondents provided input. However, only 13 provincial agencies participated in the survey and all 13 responded to this question. The four additional responses were provided by other respondents.

City Agencies Only:
From the perspective of your agency, what *basic* features would you want to include in a 511 system?

		1	2	3	4	5		
		Not Important				Very Important	Average	# Responses
a	**Road & weather conditions (e.g. ice or snow cover, fog, wet, etc.)**	0	0	3	4	7	4.3	14
b	Road closures / major delays	0	0	0	1	13	4.9	14
c	Special events	0	0	2	4	8	4.4	14
d	Construction / maintenance information	0	1	0	4	9	4.5	14
e	Travel times	2	1	5	3	2	3.2	13
f	Amber Alerts	1	1	1	7	4	3.9	14
g	Real-time congestion	2	0	2	4	6	3.9	14
h	Real-time traffic signal conditions	2	1	2	8	1	3.4	14
i	Camera still images (web only)	2	2	4	6	0	3.0	14
j	Camera video images (web only)	2	3	3	5	1	3.0	14
k	Ferry service information	8	0	2	2	2	2.3	14
l	Pedestrian and bicycling information	2	2	6	2	2	3.0	14

Fourteen agencies provided responses to this question. However, only 10 of these respondents represented city or regional municipalities. The remaining four respondents represented other agencies. Considering all responses, from a City agency perspective, the most important features of a 511 system include road closures / major delays, construction and maintenance information, special events, and road and weather information. The least important features include ferry service information, cameral video and still images, and pedestrian and cycling information.

Transit Agencies Only:
From the perspective of your agency, what *basic* features would you want to include in a 511 system?

		1	2	3	4	5		
		Not Important				Very Important	Average	# Responses
a	Fare and schedule information	1	1	0	1	12	4.5	15
b	Accessible transit information	1	0	3	2	9	4.2	15
c	Real-time bus schedule adherence	3	0	3	2	7	3.7	15
d	Next vehicle arrival	3	0	1	2	9	3.9	15
e	Inter-modal (e.g. regional rail)	4	2	3	1	5	3.1	15
f	Call transfers to a customer service desk	1	2	1	6	5	3.8	15

Fifteen agencies provided responses to this question. Many of the responding agencies are not primarily transit agencies, though they do have interests in transit.

Considering all responses, from a transit agency perspective, the most important features of a 511 system include fare and schedule information, accessible transit information, and next vehicle arrival information. The least important feature is inter-modal information.

Question 12

Further to Question 11, from the perspective of your organization, what *specialized services* would you want to include in a 511 system?

		1	2	3	4	5		
		Not Important				Very Important	Average	# Responses
a	Tourism services (static information and reservations)	7	5	10	6	4	2.8	32
b	Parking information	12	7	6	3	4	2.4	32
c	Points of Interest (local gas, restaurants, shopping, etc.)	5	9	9	7	1	2.7	31
d	Driving directions	11	3	9	7	2	2.6	32
e	Inter-regional travel information	1	8	5	13	5	3.4	32
f	Multi-modal trip planning	4	4	5	10	9	3.5	32
g	Incident reporting	4	2	6	5	14	3.7	31
h	Extended transportation facility information (e.g. airports, taxis, shipping, etc.)	2	10	9	8	3	3.0	32
i	Transportation Demand Management (TDM) services (e.g. ride matching)	9	4	6	9	4	2.8	32
j	Concierge services (for reservations, additional details, etc.)	16	11	4	1	0	1.7	32
k	Personalized (i.e. customer-specific) services	12	7	5	6	2	2.3	32

The most important specialized features for a 511 system include incident reporting and multi-modal trip planning. The least important features include concierge services, personalized services, parking information, and driving directions.

The relatively high variability of the responses is likely due, at least in part, to the fact that respondents were asked to identify the importance of each feature to their own organization. Depending on the type of organization, some features may be inherently more relevant than others.

Question 13

In your agency's opinion, the *primary* goal of a 511 system should be to improve:

		1	2	3	4	5		
		Not Important				Very Important	Average	# Responses
a	Safety	2	2	4	5	19	4.2	32
b	Arrival time reliability	2	1	4	16	9	3.9	32
c	Choice in mode of travel	2	4	7	9	9	3.6	31
d	Ability of public agency to manage travel systems	5	0	4	14	9	3.7	32
e	Ability to gather customer feedback	4	2	9	13	4	3.3	32
f	Availability of road closure and congestion information	2	0	5	4	20	4.3	31
g	Impact of travel on the environment	2	3	14	7	6	3.4	32

The respondents indicate that the primary goals of a 511 system should be the provision of road closure and congestion information, safety, and arrival time reliability. The least important goals include the ability to gather customer feedback and the impact of travel on the environment.

City Agencies Only:
From the perspective of your agency, what *basic* features would you want to include in a 511 system?

		1	2	3	4	5		
		Not Important				Very Important	Average	# Responses
a	Road & weather conditions (e.g. ice or snow cover, fog, wet, etc.)	0	0	3	4	7	4.3	14
b	Road closures / major delays	0	0	0	1	13	4.9	14
c	Special events	0	0	2	4	8	4.4	14
d	Construction / maintenance information	0	1	0	4	9	4.5	14
e	Travel times	2	1	5	3	2	3.2	13
f	Amber Alerts	1	1	1	7	4	3.9	14
g	Real-time congestion	2	0	2	4	6	3.9	14
h	Real-time traffic signal conditions	2	1	2	8	1	3.4	14
i	Camera still images (web only)	2	2	4	6	0	3.0	14
j	Camera video images (web only)	2	3	3	5	1	3.0	14
k	Ferry service information	8	0	2	2	2	2.3	14
l	Pedestrian and bicycling information	2	2	6	2	2	3.0	14

Fourteen agencies provided responses to this question. However, only 10 of these respondents represented city or regional municipalities. The remaining four respondents represented other agencies. Considering all responses, from a City agency perspective, the most important features of a 511 system include road closures / major delays, construction and maintenance information, special events, and road and weather information. The least important features include ferry service information, cameral video and still images, and pedestrian and cycling information.

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From the perspective of your agency, what *basic* features would you want to include in a 511 system?

		1	2	3	4	5		
		Not Important				Very Important	Average	# Responses
a	Fare and schedule information	1	1	0	1	12	4.5	15
b	Accessible transit information	1	0	3	2	9	4.2	15
c	Real-time bus schedule adherence	3	0	3	2	7	3.7	15
d	Next vehicle arrival	3	0	1	2	9	3.9	15
e	Inter-modal (e.g. regional rail)	4	2	3	1	5	3.1	15
f	Call transfers to a customer service desk	1	2	1	6	5	3.8	15

Fifteen agencies provided responses to this question. Many of the responding agencies are not primarily transit agencies, though they do have interests in transit.

Considering all responses, from a transit agency perspective, the most important features of a 511 system include fare and schedule information, accessible transit information, and next vehicle arrival information. The least important feature is inter-modal information.

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		Not Important				Very Important	Average	# Responses
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b	Parking information	12	7	6	3	4	2.4	32
c	Points of Interest (local gas, restaurants, shopping, etc.)	5	9	9	7	1	2.7	31
d	Driving directions	11	3	9	7	2	2.6	32
e	Inter-regional travel information	1	8	5	13	5	3.4	32
f	Multi-modal trip planning	4	4	5	10	9	3.5	32
g	Incident reporting	4	2	6	5	14	3.7	31
h	Extended transportation facility information (e.g. airports, taxis, shipping, etc.)	2	10	9	8	3	3.0	32
i	Transportation Demand Management (TDM) services (e.g. ride matching)	9	4	6	9	4	2.8	32
j	Concierge services (for reservations, additional details, etc.)	16	11	4	1	0	1.7	32
k	Personalized (i.e. customer-specific) services	12	7	5	6	2	2.3	32

The most important specialized features for a 511 system include incident reporting and multi-modal trip planning. The least important features include concierge services, personalized services, parking information, and driving directions.

The relatively high variability of the responses is likely due, at least in part, to the fact that respondents were asked to identify the importance of each feature to their own organization. Depending on the type of organization, some features may be inherently more relevant than others.

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		1	2	3	4	5		
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a	Safety	2	2	4	5	19	4.2	32
b	Arrival time reliability	2	1	4	16	9	3.9	32
c	Choice in mode of travel	2	4	7	9	9	3.6	31
d	Ability of public agency to manage travel systems	5	0	4	14	9	3.7	32
e	Ability to gather customer feedback	4	2	9	13	4	3.3	32
f	Availability of road closure and congestion information	2	0	5	4	20	4.3	31
g	Impact of travel on the environment	2	3	14	7	6	3.4	32

The respondents indicate that the primary goals of a 511 system should be the provision of road closure and congestion information, safety, and arrival time reliability. The least important goals include the ability to gather customer feedback and the impact of travel on the environment.

Question 14

If a 511 system was deployed, who do you anticipate will be the primary users of the information you provide within the system?

		1	2	3	4	5		
		Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree	Average	# Responses
a	Commuters	0	0	0	11	19	4.6	30
b	General public	0	0	1	17	13	4.4	31
c	Emergency service providers	2	8	4	8	8	3.4	30
d	Tourists	0	1	3	14	12	4.2	30
e	Public transit users	1	3	5	10	11	3.9	30
f	Para-transit users	0	4	10	9	7	3.6	30
g	Pedestrians	5	12	8	5	0	2.4	30
h	Cyclists	4	10	10	6	0	2.6	30
i	Media outlets	3	5	4	6	12	3.6	30

It is anticipated that the primary users of 511 system information will be commuters, followed closely by the general public. It is anticipated that pedestrians, cyclists, and emergency service providers are highly unlikely to be primary users.

Question 15

Please indicate your agency's opinion on the following issues:

		1	2	3	4	5		
		Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree	Average	# Responses
a	There should be a user cost for basic 511 services	11	14	5	1	0	1.9	31
b	There should be a user cost for specialized 511 services	3	6	4	15	3	3.3	31
c	There is a need to clarify the legal and regulatory issues surrounding the sharing of data and the protection of privacy	0	2	2	20	7	4.0	31
d	There is a need for strong national 511 content and deployment consistency guidelines	1	2	3	17	8	3.9	31
e	There is a need for strong data sharing standards for ATIS	0	0	1	19	11	4.3	31

Respondents indicated that there is a need to: establish data sharing standards, clarify issues surrounding the sharing of data, and develop national guidelines for 511 deployment. There should not be a user fee for basic 511 services. There is no consensus on whether a user fee should be applied for specialized 511 services.

Question 16

What do you see as potential impediments to deployment for your agency?

	#	%
Budget	18	62%
Data availability	1	3%
In-house technical expertise required for operations	2	7%
Other (provide brief description)	8	28%
Total	29	

Note: The survey permitted respondents to select only one of the four available responses.

Budget is cited as the single most important barrier to 511 service deployment; however, many respondents also indicated (in the text comment field) that the other impediments were also significant issues.

Question 14

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		Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree	Average	# Responses
a	Commuters	0	0	0	11	19	4.6	30
b	General public	0	0	1	17	13	4.4	31
c	Emergency service providers	2	8	4	8	8	3.4	30
d	Tourists	0	1	3	14	12	4.2	30
e	Public transit users	1	3	5	10	11	3.9	30
f	Para-transit users	0	4	10	9	7	3.6	30
g	Pedestrians	5	12	8	5	0	2.4	30
h	Cyclists	4	10	10	6	0	2.6	30
i	Media outlets	3	5	4	6	12	3.6	30

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		1	2	3	4	5		
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b	There should be a user cost for specialized 511 services	3	6	4	15	3	3.3	31
c	There is a need to clarify the legal and regulatory issues surrounding the sharing of data and the protection of privacy	0	2	2	20	7	4.0	31
d	There is a need for strong national 511 content and deployment consistency guidelines	1	2	3	17	8	3.9	31
e	There is a need for strong data sharing standards for ATIS	0	0	1	19	11	4.3	31

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Total	29	

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Budget is cited as the single most important barrier to 511 service deployment; however, many respondents also indicated (in the text comment field) that the other impediments were also significant issues.

CHAPTER 3: COMMENTS

Respondents were solicited for any additional comments they wished to provide. Following are comments received via the survey.

Concernant la question 15 : il y a effectivement lieu de développer des lignes directrices, mais il faut que les organismes qui ont déjà des systèmes d'information puissent les utiliser tels quels, et graduellement implanter les lignes directrices qui seront développées. Le déploiement ne devrait pas être uniforme, mais plutôt harmonisé puisque les conditions peuvent varier grandement d'une région à l'autre.
We should be very careful not to assume that a 511 system is the primary tool for ATIS. Several functions, such as trip planning, would be difficult to implement with a 511 system. Consequently, we should start with traveller information needs and then determine whether 511 is the correct tool to support each of the information needs.
Data availability, technology upgrades and sufficient technical resources are obviously impediments to "511" deployment but those are issues that funding could assist with so budget is the main issue.
We (a transit authority) currently provide schedule and fare information on our website and through a call centre. The information is based on 'planned' information rather than 'real-time'. We do not have a mechanism to provide real-time information. However, our existing systems are well utilized and provide the information required by the vast majority of our customers. Supplemental information would be useful, but I would not envision a 511 system replacing the services we already provide to our customers.
Interoperability with the US is very important.
As a provincial agency, we already provide road reports and traffic camera images on our web site. We also have an IVR system. The next generation of our road reports system is expected to go live Fall 04.
Mon commentaires à la question 16 résume la position de plusieurs sociétés de transport. A discuter à l'ACTU
Our agency intends to pursue regional ATIS deployment with 511 as a later phase. The primary barrier to 511 is lack of funding for content and the need to operating funds.
Need to focus on basic system needs first, i.e., traffic incident information, transit info to build up a strong client base before branching out to other features such as yellow pages or more static info. Need fully voiced enabled system (voice recognition, concatenated speech) to provide safety for mobile users.

Appendix D

Canada 511 Functional Requirements
(February 2005)

511 READINESS IN CANADA

INNOVATION THROUGH PARTNERSHIP INTELLIGENT TRANSPORTATION SYSTEMS RESEARCH AND DEVELOPMENT PLAN FOR CANADA

TASK 3.1 - PRELIMINARY FUNCTIONAL REQUIREMENTS

FEBRUARY 2005

IBI GROUP

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1. INTRODUCTION

1.1 BACKGROUND

The Canada 511 system will provide users with 3-digit dialling access to information on travel and weather conditions nationwide. The system will contain both 'static' (non-changing, or infrequently changing information) and 'real-time' information (automatically and continuously updated information) concerning weather and travel conditions.

The 'weather component' will provide an array of weather-related services. In addition to weather conditions affecting road surface conditions, the weather component will provide information serving marine, agricultural, aviation, and other stakeholders and clients. The information provided within the 'weather component' will originate with Environment Canada.

The 'traveller component' may provide congestion, road and lane closures related to construction, special events, or traffic congestion that cause delays for businesses and the general public, as well as trip and schedule information from public and private transportation systems (e.g. public transit buses, motor coaches, ferries, rail). The information provided within the 'traveller component' will originate with local transportation authorities participating in the 511 system.

The Canada 511 system will principally employ a telephone interface to provide this information to its clients. This will provide the widest possible access to both pre-trip and en-route information.

1.2 DEFINITIONS

The following definitions are provided for reference within this document.

The Canada 511 System, or 'Canada 511'	A reference to the broad network of system infrastructure and operational processes facilitating data collection, fusion, and telephony dissemination that will collectively be known as Canada 511.
Implementers	Any federal, provincial, or local agency responsible for the commissioning of an information service that will form part of the Canada 511 system.
The Canada 511 Service	A reference to the broad scope of services and products to be supplied by the various implementers participating in the Canada 511 system.
The 511 Consortium, or 'the Consortium'	A working group of parties co-funding activities that support the development of the 511 system. Initially, the Consortium was comprised of ITS Canada, the Transportation Association of Canada, Ministère des Transports Québec, the Ministry of Transportation for Ontario, Canadian Urban Transit Association, Environment Canada and Transport Canada.

1.3 LIST OF ACRONYMS

Acronym	Definition
511C	Canada 511 Consortium
ATIS	Advanced Traveller Information
ATMS	Advanced Traffic Management System
CCTV	Closed Circuit Television
CRTC	Canadian Radio-Television and Telecommunications Commission
CUTA	Canadian Urban Transit Association
CVO	Commercial Vehicle Operations
FHWA	Federal Highway Administration (U.S.)
ITS	Intelligent Transportation Systems
IVR	Interactive Voice Response
MOA	Memorandum of Agreement
N11	Dedicated 3-digit numbers (e.g. 911, 411)
Q&A	Questions & Answers
XML	Extensible Mark-up Language

1.4 SCOPE & OBJECTIVES OF THIS REPORT

One of the first steps in developing a comprehensive 511 System is to identify the system's functional requirements. Functional requirements outline the breadth of basic functionality to arrive at a full description of what the system is intended to do. Functional requirements also help to identify data requirements (i.e. the information needed to perform the desired functions).

The functional requirements for Canada 511 are categorized as follows:

- Technical Requirements;
- System Requirements;
- System Interfaces and Partnering; and
- Optional/Enhanced Services.

The following report will indicate the overall concept of operations required, the requirements necessary to deploy a basic 511 system and the optional requirements available for each deploying Agency/Group.

2. CONCEPT OF OPERATIONS

2.1 GENERAL

The development of the Canada 511 System will incorporate a hybrid of 'bottom-up' and 'top-down' design approaches. This creates specific needs with respect to defining functional requirements that promote a consistency amongst deployments.

The weather components will be designed and managed as a top-down approach, meaning that the system infrastructure, operations, management and maintenance will be the responsibility of a single agency, Environment Canada. This approach is necessary as Environment Canada is currently the primary provider of weather information in Canada. The functional requirements for the weather services and products available within 511 will be defined by Environment Canada and are considered outside of the scope of this document.

The traveller component will be designed and managed as a bottom-up approach, meaning that there will be a broadly distributed responsibility for system infrastructure, operations, management and maintenance. Any local agency, at any level of government (federal, provincial, and municipal) may participate. Other local participants would then connect to the system via integration with the local implementer's (or host's) systems.

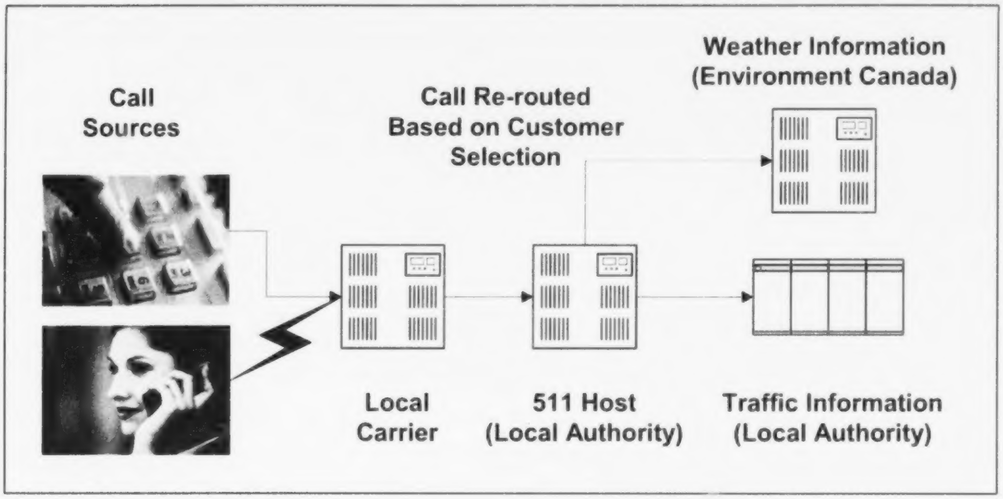
The result will be many discrete systems offering local transportation information, and a single central system offering weather information, that will be connected only through telephony switching.

Many agencies currently providing (or interested in providing) traveller information may choose to participate in Canada 511. To encourage the participation of agencies with existing systems, participation will not be predicated on either (a) adherence to a specific system infrastructure configuration, or (b) the provision of specific information types. However, regardless of the whether the agency is operating a legacy system, or new system, the 'look and feel', and manner of information delivery, will be consistent from location to location. This will be made possible through the publishing of these Functional Requirements and the Canada 511 Content and Consistency Guidelines as part of the 511 system deployment programme. As not all local authorities currently provide traveller information, it is expected that the traveller information component of the system will vary in detail by location.

By dialling 511 from a land line or mobile telephone, travellers' calls will be switched by the phone provider to a local or toll free number (depending on the exchange of origin) that accesses the local 511 implementer's (or host's) system. The implementer's system will query the caller as to their preference for weather or traveller information (See Figure D-1). The answer provided will reroute the caller to either Environment Canada's weather service providing information for that area, or to the local traveller information service.

For the purposes of these Functional Requirements, it has been assumed that there will be a local 511 traveller information provider. In the instance where one is not yet available, a 511 call will be routed directly to the Environment Canada system.

Figure D-1: Canada 511 Concept of Operations



Systems operating under the Canada 511 System moniker shall provide public access to traveller information via wireless, landline and payphone telephones. An Interactive Voice Recognition System or touch-tone system will be used as the user interface.

As of this report date, the Canada 511 Consortium is considering whether to include *Canada 511 Content and Consistency Guidelines* for 511 websites as part of the 511 system deployment programme. These guidelines would assist in the design of websites that provide supporting text and graphical information that complement telephone-based 511 systems.

Deployed 511 systems should provide certain 'basic' levels of information, as described within these Functional Requirements. The identification of a set of basic information is intended to provide a degree of consistency from location to location. It is not intended to dictate the content of a local ATIS operating under the 511 branding. For example, there may be certain data components of the 'basic content' that are either not collected, are not yet available, or deemed not required by the local authority. However, should these data be included within the local 511 deployment, it would follow the *Canada 511 Content and Consistency Guidelines* to maintain the desired level of consistency between deployments.

Therefore, upon start-up, it is expected that local 511 ATIS systems will be populated with the available 'basic level' information components (as described in **Section 3.1** – *Basic Data Types*) for the local coverage area (e.g. the area over which the deploying agency has authority). As local / municipal coverage becomes available or desirable (as identified by the Deploying Agency), the system will increasingly incorporate more of these basic data products and information.

The 511 System shall ensure as broad a distribution of traveller information as possible, at little or no expense to the travelling public. The above-noted 'basic level' of information shall be provided at no additional expense to the end-user beyond the cost of a local call.

The exception to this goal of free access will be the ability for the deploying Agency to develop 'enhanced services' that may be made available at an additional charge. Examples of such services are included in **Section 3.1.2** – *Optional Traveller Information*, of these Functional Requirements.

The long-term goal of the Canada 511 System is to provide a uniform access and the best possible availability of information services throughout Canada. By encouraging the integration of various data sources into a single traveller information operation, the 511 System will be bring together the most comprehensive picture of multimodal travel conditions available in any one location.

2.2 Stakeholder Needs

2.2.1 BACKGROUND

A survey of potential deploying agencies was conducted between June and September 2004 to determine a set of preliminary and rudimentary stakeholder needs that may be the basis of the functional requirements exercise. The survey achieved broad geographic diversity, including a total of 13 provincial / territorial agencies, 14 municipal agencies, and 4 public transit agencies and a national private bus carrier. The following section summarizes the results of the survey. The full report is included as **Appendix C**.

2.2.2 SURVEY FINDINGS

All of the organizations participating in the survey believe there is a need to provide telephone-based or web-based traveller information. The following were considered characteristics of a good information delivery system (listed in the order of their importance):

- Ease of Access / Use;
- Accuracy of Information;
- Timeliness of Information;
- Ubiquitous information;
- Provision of Real-time Information;
- Provision of General Information;
- Services for People with Disabilities; and
- Multilingual Services.

The following items were considered to be the primary advantages of facilitating access to consolidated traffic information (in order of importance):

- 'One stop shopping' for customers;
- Network efficiency;
- Public safety;
- Maximizing utility of other related investments (e.g. ATMS);
- Public relations tool;
- Provides quality control measures; and
- Relief to existing call centres.

The following ATIS delivery technologies are most likely to be deployed within the next 5 years by the agencies surveyed (listed from most common):

- Web-based information;
- Telephone-based information;
- Variable Message Signs;
- Email;
- PDA;
- TXT messaging;
- Highway Advisory Radio; and
- Pager.

There was considerable variability in terms of the stakeholders' perspectives of what basic features should be included in a 511 system. However, a graphically-oriented interface, trip planning, contact information, and customer feedback were perceived as important, while employment information and agency publications were perceived as relatively unimportant.

From a provincial agency perspective, the most important features of a 511 system include (in order of importance) road closures/major delays, road and weather information, construction and maintenance information, and amber alerts.

From a municipal agency perspective, the most important features of a 511 system include (in order of importance) road closures/major delays, construction and maintenance information, special events, and road and weather information.

From a transit agency perspective, the most important features of a 511 system include (in order of importance) fare and schedule information, accessible transit information and next vehicle arrival information. The least important feature is inter-modal information.

The stakeholders as a whole indicated that the most important 'specialized features' for a 511 system include incident reporting and multi-modal trip planning. The least important 'specialized features' include concierge services, personalized services, parking information and driving directions. However, it was noted that there was considerable variability in the answers provided. This may be due, at least in part, to the fact that respondents were asked to identify the importance of each feature to their own organization rather than to industry in general. Depending on the type of organization and its needs, some features may be inherently more relevant than others. Further, the very high indication of need for incident information suggests that it should be considered a 'basic information services' with other 'road closure' types of information.

With respect to specialized services, there seemed to be a difference in opinion between transit and non-transit agencies. The Transit operators indicated that inter-modal information was not important, but the broader stakeholders have indicated that offering information on multi-modal travel options to the public is considered a high priority. While not conclusive, this may be explained by transit agencies' traditional focus on transit-only trip planning.

Interestingly, the stakeholders as a whole indicated that the primary goal of a 511 system should be the provision of road closure and congestion information. Safety and arrival time reliability were only next in importance. The least import goals include ability to gather customer feedback and choice in mode of travel.

It is anticipated that the primary users of 511 system information will be commuters followed closely by the general public. It is anticipated that pedestrians, cyclists, and media outlets are highly unlikely to be primary users.

Stakeholders where asked to comment on several 'value statements' concerning the operation of a 511 System. They were asked to agree, disagree, or offer no opinion on a number of these statements. The results are tabulated in Table D-1.

Table D-1: Stakeholder Value Statements

	Number of Respondents				
Question	Strongly Disagree	Disagree	No Opinion	Agree	Strongly Agree
a There should be a user cost for basic 511 services	11	14	5	1	0
b There should be a user cost for specialized 511 services	3	6	4	15	3
c There is a need to clarify the legal and regulatory issues surrounding the sharing of data and the protection of privacy	0	2	2	20	7
d There is a need for strong national 511 content and deployment consistency guidelines	1	2	3	17	8
e There is a need for strong data sharing standards for ATIS	0	0	1	19	11

From these responses, we can derive that:

- There is a strong aversion to charging the user for basic 511 services;
- There is a strong support for charging the user for specialized 511 services;
- There is a strong feeling that the legal and regulatory issues surrounding the sharing of data and the protection of privacy are unclear at this time;
- The stakeholders strongly believe there is need for national 511 content and deployment consistency guidelines; and
- The stakeholders strongly believe there is need for strong data sharing standards for ATIS.

Additional comments received in the survey that affect the Functional Requirements include:

- Rather than replacing these systems, there is a need for the 511 System to work with existing information services provided by transit agencies;
- Deploying agencies should perfect their systems based on 'basic information types' before expanding to premium features;
- 511 systems should require voice-activated IVR to allow for hands-free operation en-route; and
- Such systems should be interoperable with the adjacent U.S. systems.

2.2.3 RECOMMENDATIONS ARISING FROM THE SURVEY

On the basis of these survey results, the following recommendations have been carried forward within the remainder of this Functional Requirements report.

- 511 Systems should focus on commuters as their primary customer market;
- 511 Systems should focus on ease of access, ease of use, accuracy of information, and timeliness of information delivery;
- 511 Systems should not charge for the use of 'basic services';
- While there was considerable variability in needs, based on operating responsibilities, the 511 system should include the following basic features where source data is available:
    a. Road closures and major delays (including incident information);
    b. Road and weather condition monitoring;
    c. Construction and maintenance information;
    d. Amber Alerts;
    e. Special events;
    f. Transit fare and schedule information;
    g. Accessible transit information;
    h. Next transit vehicle arrival information;
    i. Transportation authority contact information; and
    j. Customer feedback options.
- 511 Implementers may charge for the use of 'specialized services';
- While it will be left entirely up to the discretion of the operating authority (the implementer) to proceed with any specialized services, there is a clear indication that multi-modal trip planning would be desirable by the stakeholder surveyed;
- There is a need to clarify the legal and regulatory issues, data sharing issues, and the protection of privacy issues surrounding ATIS; and
- There is a need to provide clear and concise 511 System content and deployment consistency guidelines.

Lastly, there was a clearly defined need and intent on the part of these stakeholders to include equivalent information on a website. The responses to the stakeholder survey also implied a preference to use the IVR for dynamic information and to leave static information on websites. Many of the American states that have deployed 511 to-date have equivalent websites that complement the operation of their IVR. The 511 Consortium will consider further whether functional requirements and deployment guidelines should be developed for accompanying 511 websites.

2.3 SYSTEM CONFIGURATION OVERVIEW

As noted previously, Canada 511 will be a collection of local 511 traveller information systems that will provide connectivity to a central system at Environment Canada that provides weather services for the system

The local 511 systems providing traveller information will themselves be made up of several inter-connected subsystems performing data collection, creating information products, and distributing these information products to various end-user stakeholders.

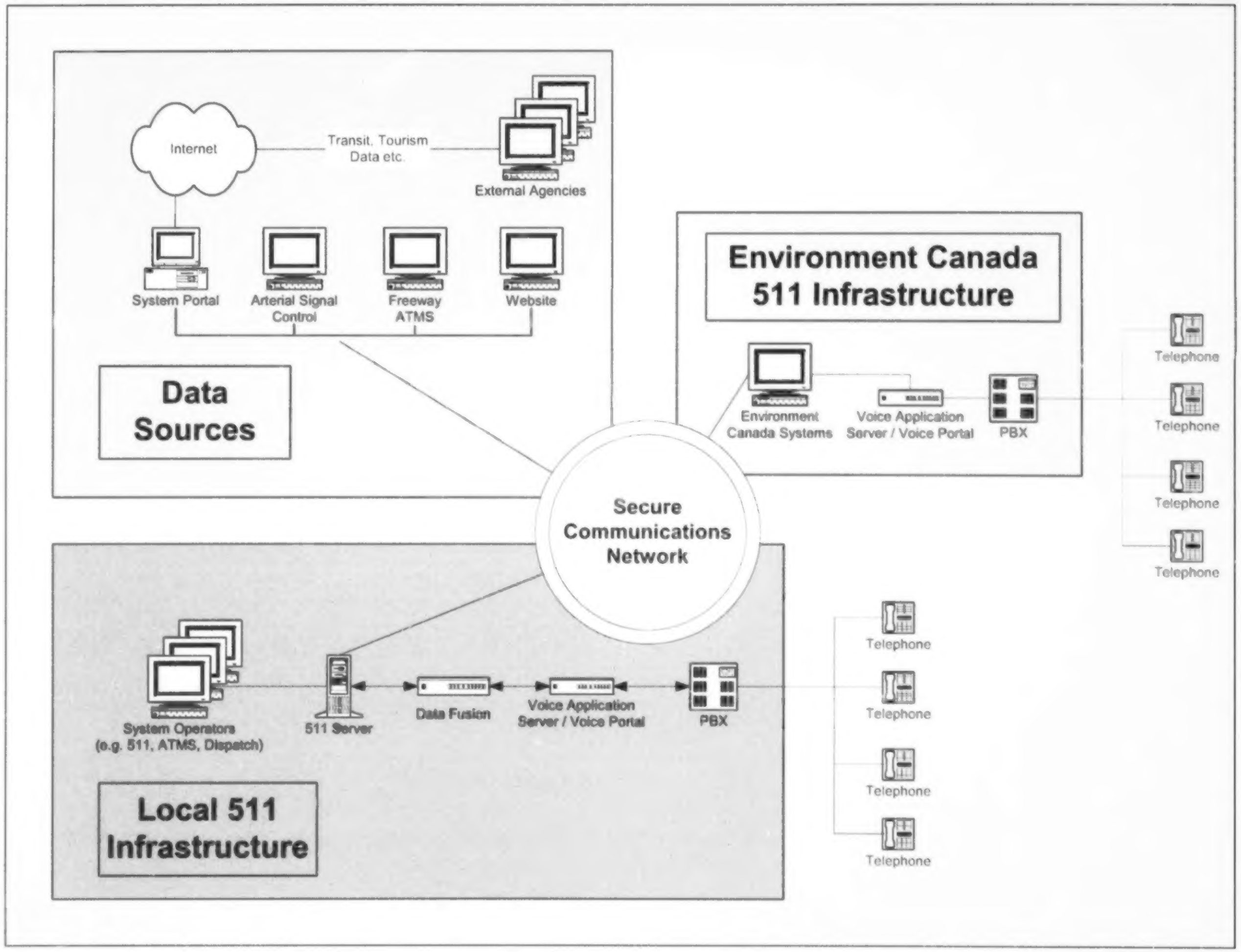
It is important to note that the systems that will be used as the 511 platforms may be legacy systems, and are not necessarily new infrastructure for the local 511 implementer. These systems may be already be providing traveller information services. Specifically:

- Most Provinces offer an IVR that provides road conditions and construction information seasonally; and
- Some municipalities provide traffic conditions and road closure information over websites and IVR.

It is not the intention of the Canada 511 System development effort to replace or wholly reconstruct these existing systems. While most municipalities and Provinces do not operate fully functioning ATIS, many do operate a number of the building blocks to support such a system, including freeway and arterial traffic management systems, traffic signal control systems, data warehousing systems, and sometimes combinations of such systems. In these instances, some modest system development efforts may be sufficient to launch a 511 service.

Figure D-2 provides an example overview of a system configuration that may be employed by a deploying agency. The architecture incorporates a basic information system concept that includes interfaces to common internal data sources, external data sources, data fusion processes, database and methods of presenting this information to the user using an IVR. This exhibit is provided as an illustration only, and local agencies may only provide some part of this structure as part of their 511 service.

Figure D-2: System Configuration


Internet
Transit, Tourism Data etc.
External Agencies
System Portal
Arterial Signal Control
Freeway ATMS
Website
Data Sources
Environment Canada 511 Infrastructure
Environment Canada Systems
Voice Application Server / Voice Portal
PBX
Telephone
Telephone
Telephone
Telephone
Secure Communications Network
System Operators (e.g. 511, ATMS, Dispatch)
511 Server
Data Fusion
Voice Application Server / Voice Portal
PBX
Local 511 Infrastructure
Telephone
Telephone
Telephone
Telephone

2.4 OPERATIONAL OVERVIEW

The local agency that elects to be a local 511 implementer shall assume a number of responsibilities, as detailed within the following section.

The local 511 System implementer will lead the development of the local traveller information system. Ideally, this will include a long-range planning exercise focussed on future ATIS service and operational improvements, and a system growth plan that addresses potential future increases in system usage. The growth plan would ideally identify the schedule, means and budgetary requirements to bring additional data source partners into the system.

The local 511 System implementer will be responsible for all costs associated with the development, operations and maintenance of the local 511 system.

The local 511 System implementer will also be responsible for maintaining contact and fostering the working relationships with existing data source agencies and stakeholders. These relationships take time to maintain and will be crucial to the on-going supply of reliable traveller data from these sources.

The local 511 System provider will proactively seek to establish additional data-sharing relationships with potential data source agencies. This will expand the system benefits and encourage a broader use of the 511 System.

The local 511 System implementer will be responsible for the development and implementation of an appropriate QA/QC process to assure integrity of the data stream. This process will follow the Canada 511 Content and Consistency Guidelines. In this way, travellers crossing 511 jurisdictional boundaries will benefit from a consistent level of quality on the data presented.

The local 511 System implementer will participate in, and provide on-going resource (i.e. time and financial) support to the Canada 511 Consortium, in the development and promotion of Canada 511. Promotion is particularly important to the success of Canada 511. On-going promotion will be needed to maintain a consistently high level of traveller usage.

It is anticipated that the local 511 System implementer will be required to provide reporting on performance measures related to the local 511 System deployment.

The local 511 System implementer will be responsible for all negotiations and coordination with the local telecommunications service provider to provide seamless connection into the 511 Traveller Information System. The proposed system configuration will have calls switched from the local wireless and landline carriers to the local 511 System implementer's system.

The local 511 System implementer will, in all instances, following the Canada 511 Content and Consistency Guidelines. This will not necessitate the provision of any one specific type of data. Instead, it will ensure that the information presented is of a form and quality consistent with other local 511 Systems providing similar information.

The Canada 511 Consortium will provide broad strategic and tactical direction, coordinate marketing initiatives and develop marketing tools, and provide on-going support in the form of updates to the Canada 511 Content and Consistency Guidelines.

2.5 PHASED IMPLEMENTATION

While Environment Canada stakeholders would benefit from an early roll-out of 511 based primarily on weather information, there is a risk that the system will be perceived as an exclusively weather-related service upon subsequent addition of traveller information. To address this concern, it is envisioned that the Canada 511 service be deployed in two broad stages.

Upon initial delivery of the Canada 511 service, it will provide:

- Primarily weather-related information encompassing the range of services that Environment Canada deems desirable as part of its initial deployment. This deployment would be nationally-based, providing local, regional and national weather information for all areas of the country; and
- This stage would also see the introduction of generally higher-level 'static' (i.e. non-real time) information on traveller services provided by the federal and provincial levels of government. This stage would likely demonstrate only limited use of real-time traffic information, as most implementing agencies do not currently provide this information. The 'static' component may include general information (that generally doesn't change with time) on the Trans-Canada Highway System, ferries schedules and status, border crossing information, CVO information, provincial driving regulations, licence and vehicle registration information, and any other available travel information.

The second stage is characterized as an on-going period (versus a milestone roll-out) wherein multi-modal traveller information would be included on the system as it becomes available locally. This information may include, for example, additional static information at the local level (city, provincial, etc.), and real-time information for provincial and local roads, and for transit agencies, as it becomes available.

2.6 BUSINESS MODEL

A Business Plan has not yet been formulated pending input from the 511C. It is assumed that the 511C will have fundamental input pertinent to the establishment of such a uniform business model for the delivery of the 511 system.

Such a business model would define the options available to pay for the delivery of the service (e.g. the telephony costs including toll charges, switching, etc.) and the costs of hosting the service (e.g. the development of a 'reception system' used to select weather or transport information). Establishing such a business model would improve the uniform sustainability of the system.

Other potential questions that a Business Model could address:

a. Will the 511C be suggesting specific business model arrangements that will allow the local provider to recoupe the costs of implementation?

b. Will the 511C be suggesting specific business model arrangements that will allow the local telephony provider to recoupe the costs associated with switching?

c. Will the 511C allow local practices with respect to charging for information?

d. Will the Functional Requirements touch on third-party promotion / advertising, etc. and the potential for revenue generation?

3. TECHNICAL REQUIREMENTS

3.1 TRAVELLER INFORMATION TYPES

3.1.1 BASIC INFORMATION

The Canada 511 System will promote the following static and dynamic (real-time) information as 'basic information' within the system. This means that where a deploying agency has the following information available, it should be made available to the caller as part of the 511 system. Where this information is available, the provider shall present this information per the recommended Canada 511 Content and Consistency Guidelines. For highways and (where applicable) arterial roads, this will include navigation through 'route' and then 'link' to the desired content.

Multi-modal Information	Road closures and major delays (including incident information)
	Road and weather condition monitoring
	Construction and maintenance information
	Amber Alerts
	Special events
	Travel times
	Queue lengths
Transit Information	Transit fare and schedule information
	Accessible transit information
	Next transit vehicle arrival information
Static & General Information	Transportation authority contact information
	Customer feedback options

Ideally, and where available from the data source, the following information about incidents and construction activities shall be collected:

Reason	Description of the cause and severity of the incident / event.
Location	Roadway(s) and location of the incident / event and the direction of travel (including roadway(s)/segments impacted), as well as identification of the highway ramp(s) affected.
Severity of Incident	Magnitude of the incident/event.
Impact	Effect of the incident/event on the facility(s)/segments impacted.
Status	Current state of the incident / event.
Start / end times	The start and end time of the incident / event.
Duration	Estimated length of time the incident/event will impact the facility(s) / segments involved (including estimated time of clearance).
Time-stamp	Time information was received and acted upon.

Detour Information	Alternate route direction for incidents / events (if known / available)
Contact Information	Contact information for more information on long-term events (e.g. construction) or planned events (e.g. parades).

3.1.2 OPTIONAL TRAVELLER INFORMATION

Additional traveller information types may be added to the basic content, as appropriate for local conditions. Depending on the type of organization and its needs, some features may be inherently more relevant than others for the local 511 System implementer. Throughout, when choosing optional services to pursue, it should be remembered that the primary audience for the Canada 511 system would likely be commuters, followed by the general public.

While entirely up to the discretion of the operating authority to proceed with any specialized services, there are a number of optional services that would generally be most beneficial. These include items such as multi-modal trip planning, parking information, and driving directions.

It is anticipated that pedestrians, cyclists, and media outlets are highly unlikely to be primary users. The latter groups will continue to obtain the information of most importance to them via other resources. Therefore, optional services oriented towards these specific users may not be well used.

3.2 DATA MANAGEMENT

3.2.1 MEMORANDA OF AGREEMENT

The number of potential data sources feeding the many local 511 systems will be significant. These local systems will interface with their data sources (both internal systems and those of external agencies) both automatically and manually. It will be important to establish operating norms under which these partnering arrangements will be conducted. The Canada 511 system provider should develop and execute a Memorandum of Agreement (MOA) with each data source to gain agreement on:

- Data ownership;
- Data quality and consistency;
- Data format; and
- Protection of privacy.

Model MOAs covering data sharing and privacy policies are provided within **Appendix D1** of this Functional Specification. Example Privacy Policy Statements are provided within **Appendix D2** of this Specification.

3.2.2 DATA FORMAT STANDARDS

The establishment of data format standards for the Canada 511 system will:

- Improve the consistency of information between local providers;
- Improve agencies' abilities to share data; and
- Facilitate future system-to-system interfaces between adjacent 511 System deployments (including the United States).

The Society of Automotive Engineers (SAE) J2354 standard for Advanced Traveler Information Systems will be used to standardize data format within the Canada 511 system. This XML-based standard will assist in inter-operability and facilitate data inputs from third-party sources via XML and Voice XML interfaces.

3.2.3 AUTOMATED INTERFACES

General

Wherever possible, the 511 System implementer will employ automated interfaces that support the collection and management of information directly from primary sources, either by continual feed, polling the source, or by accepting 'push' information from these sources. Ideally, the implementer's system will not have any practical limit to the number of agencies capable of interfacing with its 511 System. This level of automated data collection will provide for real-time updates of traffic information, thereby improving the timeliness of the travel information.

Interface with Environment Canada

A fully automated interface with Transport Canada will be necessary to provide a seamless operation of the Canada 511 system.

3.2.4 REDISTRIBUTION OF DATA

The local 511 System implementer will note that it is the general operating philosophy of the Canada 511 System to ensure as broad a distribution of traveller information as possible. To realize this goal, the 'Basic Information' content listed earlier in this section will be provided at no cost to the travelling public.

3.2.5 DATA OWNERSHIP

As noted in **Section 3.2.1**, the local 511 System implementer will identify and assign ownership to all participating agencies' Intellectual Property (IP) that is created for, used by, or provided to Canada 511. Such Intellectual Property may originate with any of the following groups:

- The local 511 System provider;
- Environment Canada;
- A third-party contractor; and
- Any other third-party / stakeholder acting as a data source for Canada 511.

Also, in designing, developing, implementing, operating, modifying and maintaining the local Canada 511 System deployment, the local provider shall ensure that there is no misappropriation, infringement or other violation of any Intellectual Property rights of any third party. The local provider shall be responsible for obtaining all required licenses, for the benefit of the Canada 511 System, to ensure that there is no misappropriation, violation or other infringement of any Intellectual Property rights.

3.2.6 DATA QUALITY

As noted in **Section 2.4** above, deploying agencies (implementers) should prepare a Quality Assurance and Control process that allows them to track and identify any potential problems with respect to either the accuracy or timeliness of the data streams used within its 511 system.

Accuracy

As a participant in the Canada 511 system, implementers should endeavour to ensure the highest possible level of accuracy in the data stream. Reliability of the travel information provided is of utmost importance. Unreliable information will result in a mistrust of the system.

Also, as part of the Memoranda of Agreement (MOA) established with each data source (see **Section 3.2.1**), the data source shall stipulate that the data provided is, to the best of their knowledge, accurate. The implementer shall also include as a clause within the MOA, a requirement that the data source agency will commit to resolving any data quality issues in a timely fashion upon detection of a problem.

Timeliness

As a participant in the Canada 511 system, implementers should endeavour to ensure that the information provided in the system is presented in a timely fashion. Timeliness of the travel information provided is also of significant importance. Missing information, and/or non-timely delivery of information will result in a mistrust of the system.

The following timeliness requirements shall apply to all data types loaded into the 511 System:

- Incident-related information, and other urgent information updates, shall be updated within a few minutes of change of status (as appropriate for the system capabilities and operational processes of the deploying agency); and
- Non-incident related information (e.g. planned events, static information updates, etc.) shall be updated within one day of receipt of the information status (as appropriate for the system capabilities and operational processes of the deploying agency).

Weather forecasts affecting driving conditions in the event of non-inclement weather and clear roads (i.e. information on lighting and surface conditions where available) shall be updated prior to the morning rush period, at midday, prior to the afternoon rush period, and once for forecasted overnight conditions, as appropriate for the system capabilities and operational processes of the deploying agency.

Weather-related alerts shall be treated as and 'urgent information updates', and updated within a few minutes of change of status from the data source.

3.2.7 PROTECTION OF PRIVACY

Appropriate measures shall be taken to protect the right to privacy of individuals while maintaining a reasonable level of access to the information for all public and private sector partners and clients. The local 511 System implementers shall follow the guidelines proposed within ITS America's 'ITS Fair Information and Privacy Principles' report (see **Appendix D2** of this Specification). The local 511 System implementers shall also develop a model Memorandum of Agreement, as noted in earlier in this Specification, that dictates the appropriate use of data.

3.3 DATA DISSEMINATION

3.3.1 GENERAL

The local 511 System implementer will design, commission, operate and maintain a telephone-based user interface (IVR or touchtone) for the local 511 System.

For reasons of motorist safety, it is the intention that all 511 System implementers eventually migrate their IVR or touchtone systems to a fully hands-free operation.

The local 511 System implementer will be responsible for all communications infrastructure necessary to provide a reliable system with jurisdiction-wide accessibility. This includes any and all negotiations with telecommunications carriers to effect the required switching for the 511 telephone number.

The local 511 System provider will be responsible for all marketing of these systems to increase its public profile and use.

In all instances, the local 511 System implementer shall follow the Canada 511 Content and Consistency Guidelines for information delivery.

In all instances, the local 511 System provider shall provide 'help handling', via the user interface, to the satisfaction of the Canada 511 Consortium.

The creation of data products (fusion), and the dissemination of these products via the telephone interface, shall be automated such that no human intervention is required subsequent to the initial data entry, except to approve final products for dissemination. Specifically, all voice messaging shall be automated through the touchtone or IVR system with no requirement for human voice recording.

3.3.2 USER INTERFACE REQUIREMENTS

The local 511 System implementer will provide an user interface incorporating a high quality touchtone or IVR system, incorporating industry standards for human factors, and (where applicable) following the Canada 511 Content and Consistency Guidelines for menu structure.

Where an IVR is used, the system shall be capable of recognizing a wide variety of regional accents and shall be able to easily learn local pronunciations.

Where a touchtone system is used, and the user is presented with a fixed number of menu options, the number of options shall not exceed six menu options.

The 511 System shall have the capability of presenting an override message (e.g. through a greeting or preceding the greeting) in the event of an emergency (e.g. major closures or Amber Alerts).

The system shall provide appropriate error handling that provides users with multiple opportunities to enter choices, specific directions in the event of unrecognised instructions, the ability to 'back out' of a menu option, and a failure mode that does not result in a hang-up.

The system shall provide help handling that allows users to easily access user help features that include information on system navigation, background on the system, and alternate contact information for system administrators.

The system shall provide the opportunity for user feedback as a form of quality management. The system shall, in a conspicuous manner, provide users with an opportunity to leave comments on system performance, data quality, and data timeliness.

The system shall allow users to provide comments on special topics. The system shall provide appropriate navigation to a user comment area that will be used, from time to time, for various special Agency/Group information-gathering programs (e.g. user surveys, litter reporting, requests for enforcement, etc.).

The system shall provide multilingual services to service the local language needs, as appropriate for the local 511 System implementer's jurisdiction.

The system should provide the capability for persons with hearing disabilities to access the system via TTY enabled devices. Services provided over the voice interface should have equivalent information provided over TTY.

Where the user has opted for a call transfer to another IVR system (e.g. a transit agency), the system will clearly indicate that the user is leaving the 511 Traveler Information System. Upon exit, the system will terminate the caller's 511 session.

3.3.3 SYSTEM REQUIREMENTS

The local 511 System shall have the capability of receiving calls from any land-line or mobile service provider.

The local 511 System provider shall size the number of access lines to adequately meet the anticipated call demand. The system should maintain the flexibility to increase the number of access lines should the system demand require expansion. The operating performance objective is to have the ability to accept all calls for the 90th percentile of the peak load, and should have an overall availability to callers of 99.99%, based on average call durations of 120 seconds.

The local 511 System implementer will be responsible for all negotiations with telecommunication providers and enter into all or any necessary contracts to provide services. The local 511 System provider will make every effort to provide maximum coverage for all local landline (local exchange carriers) and wireless telephone service providers.

Where service is not available because the local telecommunications provider does not provide the associated switching:

- The potential user who dials 511 should be informed and advised of alternatives; and
- A toll-free number should be established providing connection to the local 511 service.

APPENDIX D1

CANADA 511 TRAVELLER INFORMATION SYSTEM EXAMPLES OF MEMORANDA OF AGREEMENT (MOA) FOR DATA SHARING AND PRIVACY POLICIES

Data Sharing and Usage
Memorandum of Agreement (MOA)
Highways Department (HD)
511 Traveler Information System (511)

This AGREEMENT dated ______________, is made and entered into by and between the members of the Provincial 511 Technical Advisory Committee (hereafter referred to as Agency/Group 511 TAC):

WITNESSETH

RECITALS

1. By the authority granted in [relevant state regulation] the Provincial Highways Department (Agency/Group) may enter into cooperative agreements with the counties and cities of the state for the performance of work on certain types of improvement projects with the allocation of costs on terms and conditions mutually agreeable to the contracting parties.

TERMS AND CONDITIONS

1. Background and Purpose

The partners in this agreement seek to deploy an advance traveller information system that would provide multi-modal traffic information for free to the public and to private sector/information service providers (ISPs). This information would be made available to the public via a central Internet web site. Four types of data may potentially be shared through the Agency/Group 511 ATIS including:

- *Multimodal Transportation Information* – including traffic sensor data (traffic volume and occupancy data, travel speed information, travel times, and automatic vehicle location), incident/event reports (incident reports, construction and special events information, general roadway conditions, traffic control device/infrastructure malfunctions), video images (of traffic in local area), transit data (schedules, fares, live schedule adherence), etc;

- *Weather Information* - including data from the National Weather Service and environmental sensor station data (weather and roadway surface conditions);

- *Tourism Information* – including data from Regional Tourism Councils pertaining to attractions, lodging, and directions; and

- *Emergency Conditions Information* – including emergency procedures and contact information.

This Agreement identifies roles and responsibilities of the participating agencies in terms of data management and usage restrictions.

2. Roles and Responsibilities

Agency/Group 511 TAC: consists of a representative from each participating agency. Agency/Group 511 TAC will serve as an executive committee and will be responsible for providing and formulating the policy and institutional issues pertaining to the Provincial 511 Traveller Information System. Agency/Group 511 TAC is directed by this MOA to establish collaborative designs, implementation plans, and expansion plans associated with the Provincial 511 Traveler Information System.

Agency/Group 511 TAC: will be responsible for managing, developing, and maintaining the 511 system. Agency/Group 511 TAC will act as the main collector of data. Will act as the data disseminator and distribute the collective data to various users (including partner agencies, media, general public, future private partners, ISPs). Will disseminate data via a central toll free IVR, Internet web site and TXT service.

All other partners: Act as sources of information. Agree to provide their applicable data to Agency/Group, or their representative, for inclusion in the 511 system.

All Participating Agencies have following responsibilities:

a. Act as a source of information. Agree to provide their applicable data for inclusion in the ATIS.

b. Insure that its particular internal rules for accounting, reporting, and other administrative rules are adhered to during the course of business in participating in the Agency/Group 511 TAC.

c. Agree to share applicable ATIS data (as defined in this MOA) and infrastructure with the other organizations under the terms and guidelines as defined in this MOA and to be established by the Agency/Group 511 TAC provided that such sharing does not compromise the integrity of the organization.

d. Agree to put reasonable effort in developing a standard and checking the accuracy and reliability of the data the agency provides for the Provincial 511 ATIS.

e. Leverage financial assets where possible to create shared infrastructure in accordance with this Agreement.

f. Cover the costs for maintaining/operating their own equipment/data.

DATA SHARING GUIDELINES

Listed below are the data sharing parameters that shall be used as a general guideline for developing the ATIS system. Final parameters shall be decided by the Agency/Group 511 TAC.

- General public access to shared data will be provided via a central web site, the 511 telephone number, and TXT subscriptions.
- Measures will be implemented to provide data security and allow for different levels of access to shared data (for general public, public agencies, and private partners/media)
- Provisions for switching off real-time information for sensitive situations to certain users will be provided.
- There will be registration requirements for registered Information Service Providers/media to better track who is getting the data and for what purposes.
- Modifications to the data provided by each agency will not be allowed without permission from the agency that owns the data.
- Control of equipment, such as pan-tilt-zoom of cameras, will not be allowed without permission from the agency that owns the cameras.
- Partners will not be held responsible for the accuracy and reliability of the available data but shall put in reasonable effort to provide the accurate and reliable data.

- Only open architecture software and equipment shall be used for the Provincial 511 ATIS.
- Data will be provided free of charge to the general public. Agency/Group 511 TAC will decide whether ISPs, media, and other private companies will need to pay for the infrastructure (i.e. fiber line, software, and/or equipment) required to access the Provincial 511 ATIS data.
- Provincial 511 ATIS project resources will not be allocated to the various partners based on the amount of shared revenue contributed by each of the partners.
- Provincial 511 ATIS project resources will be allocated on a first come, first served basis until system capacity is constrained.

TERM OF AGREEMENT

This Agreement shall remain in full force and effect for a period of ten years from the date of execution. This agreement may be amended by the mutual consent of all parties in writing.

Any party may terminate its participation in this Cooperative Agreement at any time, by notifying the remaining parties in writing not less than 30 days in advance. However, all agreements to share facilities made prior to that notification may not be revoked, and shall remain in full force and effect during the remainder of the initial term of ten years.

IN WITNESS WHEREOF, the parties hereto have set their hands and affixed their seals as of the day and year hereinafter written.

Province X, by and through Agency/Group

By ______________________________

Date ______________________________

City of X, by and through its representatives

By ______________________________

Date ______________________________

Office of Travel & Tourism, by and through its representatives

By______________________________

Date ______________________________

Emergency Services, by and through its representatives

By______________________________

Date ______________________________

Provincial Police, by and through its representatives

By______________________________

Date ______________________________

Port Authority, by and through its representatives

By________________________________

Date ______________________________

Transit Agency, by and through its representatives

By________________________________

Date ______________________________

Transport Canada, by and through its representatives

By________________________________

Date ______________________________

Environment Canada, by and through its representatives

By________________________________

Date ______________________________

County A, by and through its representatives

By________________________________

Date ______________________________

County B, by and through its representatives

By________________________________

Date ______________________________

County C, by and through its representatives

By________________________________

Date ______________________________

County D, by and through its representatives

By________________________________

Date ______________________________

etc.

Privacy Policies and Principles
Memorandum of Agreement (MOA)
Highways Department (HD)
511 Traveler Information System (511)

This AGREEMENT dated ______________, is made and entered into by and between the members of the Provincial 511 Technical Advisory Committee (hereafter referred to as Agency/Group 511 TAC):

WITNESSETH

RECITALS

1. By the authority granted in [relevant state regulation] the Provincial Highways Department (Agency/Group) may enter into cooperative agreements with the counties and cities of the state for the performance of work on certain types of improvement projects with the allocation of costs on terms and conditions mutually agreeable to the contracting parties.

TERMS AND CONDITIONS

1. Background and Purpose

The partners in this agreement seek to deploy an advance traveler information system that would provide multi-modal traffic information for free to the public and to private sector/information service providers (ISPs). This information would be made available to the public via a central Internet web site. Four types of data may potentially be shared through the Agency/Group 511 ATIS including:

- *Multimodal Transportation Information* – including traffic sensor data (traffic volume and occupancy data, travel speed information, travel times, and automatic vehicle location), incident/event reports (incident reports, construction and special events information, general roadway conditions, traffic control device/infrastructure malfunctions), video images (of traffic in local area), transit data (schedules, fares, live schedule adherence), etc;

- *Weather Information* – including data from the National Weather Service and environmental sensor station data (weather and roadway surface conditions);

- *Tourism Information* – including data from Regional Tourism Councils pertaining to attractions, lodging, and directions; and

- *Emergency Conditions Information* – including emergency procedures and contact information

This Agreement outlines the policies and principles to be adhered to by the partners in order to protect the privacy of the partners and the general public.

2. Roles and Responsibilities

Agency/Group 511 TAC: consists of a representative from each participating agency. Agency/Group 511 TAC will serve as an executive committee and will be responsible for developing and revising the privacy policies and principles outlined in this Agreement.

Agency/Group 511 TAC: will be responsible for managing, developing, and maintaining the Provincial 511 ATIS. They will also be responsible that data provided directly on the 511 system

IVR, the central ATIS web site, and the TXT service conform to the policies and principles outlined in this Agreement.

All Participating Agencies: have the following responsibilities

a. Agrees to share applicable data and equipment for the Provincial 511 ATIS in a manner which conforms to policies and principles as defined in this Agreement and to be established by the Agency/Group 511 TAC provided that such sharing does not compromise the integrity of the Agency.

b. Will put in reasonable effort to monitor its data both provided directly on the Provincial 511 ATIS IVR, web site and TXT service, and/or linked to these services for conformance with this Agreement.

3. Privacy Policies and Principles

Listed below are the privacy policies and principles that shall be used as a general guideline for developing the Provincial 511 ATIS. Final parameters shall be decided by the Agency/Group 511 TAC.

- The design, use, and dissemination of the Provincial 511 ATIS shall conform to the fair information and privacy principles recommended in ITS America's Intelligent Transportation Systems Fair Information and Privacy Principles.
- Provincial 511 ATIS data shall not be used for law enforcement purposes.
- A privacy policy and principles disclaimer shall be published on the 511 IVR service and on the central Provincial 511 ATIS web site.
- Video images for use on the Provincial 511 ATIS will not generally be archived. Circumstances where recording is allowed is limited to data collection, training, debriefing, and documentation of Agency/Group 511 TAC actions.
- Video camera views will not normally be allowed to identify individuals in accordance with Agency/Group guidelines.
- The Provincial 511 ATIS web site shall include a note to the general public indicating that they shall not publish, display, distribute, or commercially exploit any of the contents on the Provincial 511 ATIS web site without written permission. The 511 IVR system shall provide instructions on how to access this information via the website or direct contact with Agency/Group.

Term of Agreement

This Agreement shall remain in full force and effect for a period of ten years from the date of execution. This agreement may be amended by the mutual consent of all parties in writing.

Any party may terminate its participation in this Cooperative Agreement at any time, by notifying the remaining parties in writing not less than 30 days in advance. However, all agreements to share facilities made prior to that notification may not be revoked, and shall remain in full force and effect during the remainder of the initial term of ten years.

IN WITNESS WHEREOF, the parties hereto have set their hands and affixed their seals as of the day and year hereinafter written.

Province X, by and through Agency/Group

By ______________________________________

Date ____________________________________

City of X, by and through its representatives

By ______________________________________

Date ____________________________________

Office of Travel & Tourism, by and through its representatives

By______________________________________

Date ____________________________________

Emergency Services, by and through its representatives

By______________________________________

Date ____________________________________

Provincial Police, by and through its representatives

By______________________________________

Date ____________________________________

Port Authority, by and through its representatives

By______________________________________

Date ____________________________________

Transit Agency, by and through its representatives

By______________________________________

Date ____________________________________

Transport Canada, by and through its representatives

By______________________________________

Date ____________________________________

Environment Canada, by and through its representatives

By______________________________________

Date ____________________________________

County A, by and through its representatives

By______________________________________

Date ____________________________________

County B, by and through its representatives

By____________________________________

Date __________________________________

County C, by and through its representatives

By____________________________________

Date __________________________________

County D, by and through its representatives

By____________________________________

Date __________________________________

etc.

APPENDIX D2

CANADA 511 TRAVELER INFORMATION SYSTEM
EXAMPLE OF PRIVACY POLICY STATEMENTS
ITS AMERICA'S INTELLIGENT TRANSPORTATION SYSTEMS FAIR INFORMATION AND PRIVACY PRINCIPLES

ITS America's
Intelligent Transportation Systems
Fair Information and Privacy Principles

These fair information and privacy principles were prepared in recognition of the importance of upholding individual privacy in implementing Intelligent Transportation Systems (ITS). The principles represent values and are designed to be flexible and durable to accommodate a broad scope of technological, social and cultural change. ITS America may, however, need to revisit them periodically to assure their applicability and effectiveness.

These principles are advisory, intended to educate and guide transportation professionals, policy makers, companies, organizations, and the public as they develop fair information and privacy guidelines for specific intelligent transportation projects. Initiators of ITS projects are urged to publish the fair information and privacy principles that they intend to follow. Parties to ITS are urged to include enforceable provisions for safeguarding privacy in their contracts and agreements.

1. **INDIVIDUAL CENTERED. Intelligent Transportation Systems must recognize and respect the individual's interests in privacy and information use.**

ITS Systems create value for both individuals and society as a whole. Central to the ITS vision is the creation of ITS Systems that will fulfill our national goals. The primacy focus of information use is to improve travelers' safety and security, reduce travel times, enhance individuals' ability to deal with highway disruptions and improve air quality. Travel information is collected from many sources, some from the infrastructure and some from vehicles, while other information may come from the transactions - such as electronic toll collection - that involve interaction between the infrastructure and vehicle. That information may have value in both ITS and non-ITS applications. The individual's interest in privacy must be respected. This requires disclosure and the opportunity for individuals to express choice if personal identification is collected.

2. **VISIBLE. Intelligent Transportation Information Systems will be built in a manner "visible" to individuals.**

ITS may create data on individuals. Individuals should have a means of discovering how the data flows operate. "Visible" means to disclose to the public the type of data collected, how it is collected, what its uses are, and how it will be distributed. The concept of visibility is one of central concern to the public, and, consequently, this principle requires assigning responsibility for disclosure.

3. **COMPLY. Intelligent Transportation Systems will comply with applicable state and federal laws governing privacy and information use.**

Privacy law is a patchwork of federal and state statutes, as well as federal and state judicial opinions. The "right" to privacy as a matter of law in the context of transportation on public roads and other facilities is limited. Intelligent Transportation Systems should provide, at a minimum, privacy protections in conformity with the law of respective jurisdictions.

4. **SECURE. Intelligent Transportation Systems will be secure.**

ITS databases may contain information on where travelers go, the routes they use, and when they travel, and therefore must be secure. All ITS information systems will make use of data security technology and audit procedures appropriate to the sensitivity of the information. ITS systems should use technological and administrative safeguards to assure that access to personally identifiable information is restricted to duly authorized individuals.

5. **LAW ENFORCEMENT. Intelligent Transportation Systems have an appropriate role in enhancing travelers' safety and security interests, but absent consent, statutory authority, appropriate legal process, or emergency circumstances as defined by law, information identifying individuals will not be disclosed to law enforcement.**

ITS has the potential to make it possible for traffic management agencies to know where individuals travel, what routes they take, and travel duration. Therefore, ITS can increase the efficiency of traffic law enforcement by providing aggregate information necessary to target resources. States may legislate conditions under which ITS information will be made available to law enforcement agencies. Absent government authority, however, ITS systems should not be used as a surveillance means for enforcing traffic laws, nor used as a tool of criminal investigation. Although individuals are concerned about public safety, persons who voluntarily participate in ITS programs or purchase ITS products should be informed of how information they are providing is used.

6. **RELEVANT. Intelligent Transportation Systems will only collect personal information that is relevant for ITS purposes.**

ITS, respectful of the individual's interest in privacy, will only collect information that contain individual identifiers that are needed for the ITS service functions. Furthermore, ITS information systems will include protocols that call for the purging of individual identifier information that is no longer needed to meet ITS needs.

7. **ANONYMITY. Where practicable, individuals should have the ability to utilize Intelligent Transportation Systems on an anonymous basis.**

Certain ITS applications (commercial vehicle operations or "mayday") require personally identifiable information to function. Others (such as automated fee payment) may be designed to enable use by individuals without identifying themselves (through anonymous debit accounts) or with identifiers for convenience (credit cards). Unless provision of identifiers is required by the ITS application, users should be provided with the opportunity to choose anonymity.

8. **COMMERCIAL OR OTHER SECONDARY USE. Intelligent Transportation Systems information stripped of personal identifiers may be used for non-ITS applications.**

American consumers want information used to create economic choice and value, but also want their interest in privacy preserved. ITS information is predictive of goods and services that interest consumers, for example, the right location for stores, hospitals and other facilities. However, personally identifiable information collected by ITS surveillance technologies is extremely sensitive. Therefore, the following practices should be followed:

ITS information absent personal identifiers may be used for ITS and other purposes. Generally, data collectors should assure that ITS information provided to private organizations for secondary uses is stripped of personal identifiers. Individuals, however, may contract to allow use of personal identifiers for secondary use if full disclosure in the intended use is made and informed consent obtained.

9. **FOIA. Federal and State Freedom of Information Act (FOIA) obligations require disclosure of information from government maintained databases. Database arrangements should balance the individual's interest in privacy and the public's right to know.**

In determining whether to disclose ITS information, governments should, where possible, balance the individual's right to privacy against the preservation of the basic purpose of the Freedom of Information laws to open agency action to public scrutiny. ITS travelers should be presumed to have reasonable expectations of privacy for personal identifying information. Pursuant to the individual's interest in privacy, the public/private framework of organizations collecting data should be structured to resolve problems of access created by FOIA.

10. **OVERSIGHT. Jurisdictions and companies deploying and operating Intelligent Transportation Systems should have an oversight mechanism to ensure that such deployment and operation complies with their Fair Information and Privacy Principles.**

Governments and companies should implement proper procedures to ensure that they protect the individual user's right to privacy, at a minimum, to the extent outlined in these principles. This mechanism may include internal directives, the appointment of a privacy officer, and/or penalties for violations. Governments and companies should have the flexibility to tailor such a system to their respective needs or circumstances.

Appendix E

Proposed Canada 511 Deployment Standards and Guidelines (February 2005)

511 READINESS IN CANADA

INNOVATION THROUGH PARTNERSHIP ITS RESEARCH AND DEVELOPMENT PLAN FOR CANADA

TASK 4.1 - PROPOSED DEPLOYMENT STANDARDS AND GUIDELINES

FEBRUARY 2005

IBI Group
in cooperation with
The University of Waterloo

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1. INTRODUCTION

1.1 Purpose of the Guidelines

Canada 511 represents a tremendous opportunity for transportation authorities across Canada to better serve their customers. The *Canada 511 Deployment Standards and Guidelines* have been developed to help guide content, system and process consistency amongst the local traveller information system deployments within the Canada 511 network across Canada.

The group of agencies tasked with overseeing the development of Canada 511, hereafter referred to as the Canada 511 Consortium (or 'the Consortium'), strongly recommends that agencies deploying Canada 511 carefully review and consider these guidelines in their implementation planning.

To reduce the chances of service confusion or inconsistency, the Canada 511 Consortium has established these guidelines emphasizing service content and consistency. Canada 511 service consistency will be established through the deploying agencies that follow these guidelines. This consistent 'feel' for Canada 511 users will be a cornerstone of this bottom-up system development process. This consistency will directly influence the effectiveness of the Canada 511 system, and may ultimately determine the systems ability to succeed. As an increasing number of services are established, a national Canada 511 service will emerge.

Thus, these guidelines are designed from a customer-centric viewpoint while being sensitive to the issues of those agencies that must gather and prepare information and manage information service provision.

In developing these guidelines, every effort has been made to build upon the significant effort that has already been undertaken to develop the 511 system within the United States. Accordingly, these Canada 511 Deployment Standards and Guidelines have been derived from the *Implementation Guidelines for Launching 511 Services* and the related *Deployment Assistance Reports* from the American 511 Deployment Coalition, as well as other Canadian and international Advanced Traveller Information System (ATIS) 'best practices'.

1.2 Background

Canada 511 will be a network of locally-deployed traveller information systems and a central weather information service (deployed by Environment Canada) that will be accessible via three-digit dialling wherever the service has been established within Canada.

The Canada 511 Consortium is the volunteer body of public and non-governmental agencies overseeing the initial deployment of Canada 511. The Consortium recognizes that 511 services are intended to be developed in a bottom-up fashion with provincial and local transportation agencies establishing services in areas and timeframes determined by the deploying agency. The positive benefits of this approach are that it:

- enables resources from many organizations to be harnessed to deploy Canada 511;
- ensures that local service needs are addressed; and
- provides many opportunities for innovation in Canada 511 service delivery.

1.3 How to Use This Document

The remainder of this document is structured as follows:

- Section 2 – The Canada 511 Vision
- Section 3 – Information Content Guidelines
- Section 4 – Service Delivery Guidelines
- Section 5 – Lessons Learned in Similar Deployments
- Section 6 – Additional Resources

These *Canada 511 Deployment Standards and Guidelines* focus on two main branches of investigation: *Service Content* and *Service Consistency* for traveller information service providers (addressed in **Sections 3 and 4** respectively).

Service Content will provide the standards that indicate what information will ideally be provided, and what format this information should follow, on the Canada 511 service. It is recognized that local systems will vary significantly in terms of the products and services included on their systems. This is appropriate, as not all jurisdictions have the same customer needs. For example, while mountain pass conditions are necessary in British Columbia, they may not be required in another province, such as Saskatchewan. However, where there is commonality in terms of customer needs (e.g. rural winter road conditions, urban traffic congestion, etc.), the types of data provided should be consistent. This branch of investigation will look into what content should always be provided (i.e. 'basic content') if applicable to a specific jurisdiction, versus content that may be optionally provided (i.e. 'optional content').

Service Consistency will provide the deployment guidelines to ensure that there is a uniform application of the Canada 511 service nationally. These will include standards in user interface operation, initial greetings, multi-lingual capabilities, quality of information, etc. to ensure that the way in which this information is presented will be consistent.

The document is designed to help make the Canada 511 Vision (see **Section 2**) a reality. However, it is recognized that a broader stakeholder input will ultimately be necessary to fully mature these standards, and to ensure the stakeholder buy-in to the deployment guidelines. If implementers have suggestions for improvements to these Guidelines, please provide this information electronically through the feedback feature at the Canada 511 website (www.511Canada.ca).

For those new to Canada 511 (or even ATIS in general), these Guidelines should serve as the basis for developing and deploying a local Canada 511 system. After reviewing these Guidelines, a potential deployer should know:

- Who are the key participants in Canada 511;
- The difference between Basic and Optional content;
- The business environment most deployers are operating in; and
- The importance that consumer research, marketing and national consistency play in developing a customer-oriented service.

While a potential deployer may not find all of the information they need to develop a local Canada 511 system, the document offers an opportunity to learn from previous deployment experiences and insights gained by other North American 511 deployers.

It should be noted that this document is intended to provide guidelines for the 'travel' component of the Canada 511 system. While this includes some weather-related services (e.g. road condition monitoring), the broader range of weather-related services offered by Environment Canada remain outside of the scope of this document.

2. THE CANADA 511 VISION

The creation and adoption of a national vision for Canada 511 is a major step in creating a sustainable information service to assist travellers across the country. The Vision helps to focus deployer's goals and user services, and establishes key milestones for the creation and adoption of a service that may one day become as widely known and commonly used as 411 or the Internet. Attainment of the Vision will help develop 511 into a mature service that is embraced by the general public.

The national vision for Canada 511 adopted by the Consortium consists of a Vision Statement and specific elements and milestones to ensure its attainment. They are outlined as follows.

2.1 Vision Statement

> ***Canada 511 will be a customer-driven multi-modal traveller and weather information service, available across Canada, accessed via telephones (and potentially other personal communications devices). Canada 511 will be realized through locally deployed interoperable systems, enabling a safer, more reliable and efficient transportation system in Canada.***

2.2 Vision Elements

The Canada 511 Vision includes the following key characteristics:

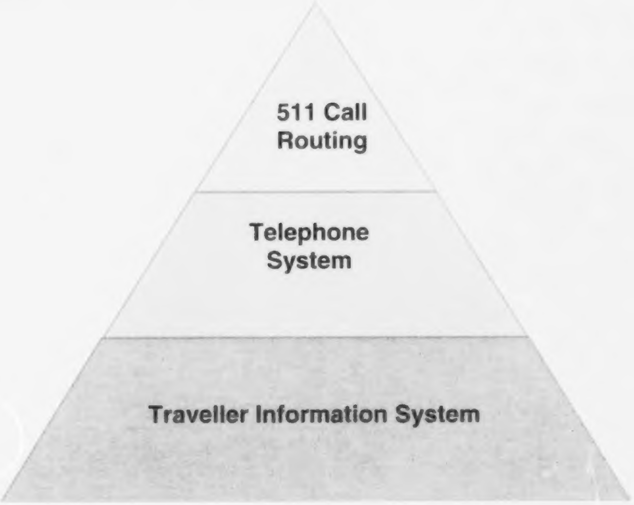
- It will have a customer focus;
- It will be consistent in content, interface and quality of service from location-to-location;
- It will serve local users, visitors and through travellers;
- It will have ubiquitous brand awareness and coverage;
- It will provide timely, accurate and reliable information;
- It will be mission critical to travellers / users, transportation system operators, and emergency providers and the information services industry;
- It will have a mix of "public good" and "value added" information;
- It will be sustainable and permanent;
- It will be continually improving;
- It will strive for complete customer satisfaction; and
- It will be nationally and cross-border interoperable.

The Canada 511 solution is seen as a method of cutting through the clutter of local information access lines, and to provide one source of travel and weather information on a multi-jurisdictional or regional basis. Unlike many intelligent transportation system (ITS) technologies, the concept of Canada 511 will be easy for the Canadian public to understand. To provide quality customer service, Canada 511 will bring ITS, traffic and incident management, public transportation and weather information all together under one umbrella, as its U.S. counterpart has done over the past several years. **Section 6.2** provides more information regarding the U.S. 511 effort.

2.3 Canada 511's Relationship to Traveller Information Systems

While planning and developing a Canada 511 service, it is important to remember that 511 is a speed dial or short cut to a telephone system, which has a large base of information available. In the hierarchy of travel information, Canada 511 is just the most visible component of what is often a large supporting ITS infrastructure, as depicted in Figure E1. Canada 511 will never be a stand-alone system, but must always rely on supporting ITS systems for data collection and product creation, as well as a robust telephone system for product delivery.

Figure E1: ATIS Infrastructure Supporting 511



The majority of operational 511 services in the United States with high call volumes are part of a larger local ATIS that provides information to travellers via multiple media. The dissemination tools can include websites, television stations and push technologies such as customizable reports via email or PDA. Examples of these comprehensive ATIS systems include the San Francisco Bay Area, and Southeast Florida.

To achieve a useful and comprehensive Canada 511 service, as with a full ATIS, deployers need be concerned with data acquisition: where will the data come from – what kind of infrastructure may be utilized; data quality – is the data timely, accurate and useful; and system integration – how will Canada 511 deliver information from unlinked systems or systems that another agency operates? Each of these elements is extremely important in achieving the "Traveller Information System" layer of the pyramid in Figure E-1. If an agency has no, or very limited traveller information services, there is benefit to proceeding up the pyramid to develop a telephone system or Canada 511 routing, unless:

- The agency combines efforts with other agencies to develop a more robust system; and/or
- The agency deploys additional systems to offer these traveller information products.

It should be noted that the specific systems developed and their related content will always be up to the discretion of the local deploying agency. These guidelines provide direction with respect to content and delivery style, but will not prescribe any specific system architecture. The expectation is that local agencies considering deploying 511 will work with their existing systems, perhaps with some modifications, to deliver Canada 511.

3. INFORMATION CONTENT GUIDELINES

The overriding philosophy of these content guidelines is that there are two fundamental types of content levels:

- *Basic Content* – This is the *highest priority* content within Canada 511. If the information content is relevant for a specific jurisdiction (e.g. transit for large urban areas), then this content should be included within the Canada 511 service. Basic Content is the focus of these guidelines.
- *Optional Content* – This is additional content that is considered beyond the Basic Content provided by a Canada 511 service. It is entirely up to the discretion of the deploying agency to include optional content. It is anticipated that these services will help to more fully address local needs. **Section 3.2** provides a summary of some possible Optional content categories and an example of what some U.S. deployers have chosen to provide.

The following sections outline the Basic and Optional content for Canada 511 and describe various issues that affect content quality and consistency within these categories.

3.1 Basic Content

Basic Content comes in three general categories:

- Introductory Information – This is primarily an interactive component that facilitates navigation (as described in **Section 3.1.1**).
- *Roadway* (Highway and Arterials) – Information associated with road closures, traffic conditions, and road surface conditions on particular roadways in a 511 service area (as described in **Section 3.1.2**); and
- *Transit or Public Transportation* – Information associated with transit services (bus, rail, etc.) in a 511 service area (as described in **Section 3.1.3**).

These content guidelines provide direction on where these content components should be provided, and recommends that every local system participating within the Canada 511 network provide this Basic Content wherever applicable. It is this Basic Content that consumers will associate as the core business of Canada 511.

In both of these content categories, the guidelines provide general principles or philosophies and specific guidance on the type of information that should be provided to callers. Note that a key concept in 511 service planning is that 511 systems must be designed to provide information collected from multiple agencies, concerning multiple modes of transportation and a wide range of content. While content is organized in different types and categories, one principal carries throughout all content:

> ***All Canada 511 services must provide sufficient "Context" to allow for unfamiliar users of the service. Users should be provided a similar 'feel' and similar navigational tools wherever the Canada 511 service is provided.***

3.1.1 INTRODUCTORY CONTENT

The Canada 511 service should present callers with the option of multilingual services as appropriate for local conditions. Therefore, upon connecting with the system, the user should hear greeting and language options in the primary language, followed by any additional languages, in order of their local importance (see Figure E-2).

Continuing in the language selected, the user will then have the option of connecting with either weather or transport information, as further detailed in the following sections.

There are a number of options to be considered in the transfer of calls between the weather and transport 'sides' of the system. These will be explored as part of further tasks in the Canada 511 development Plan.

3.1.2 ROADWAY CONTENT

As the primary conduit of travel in Canada, information about multi-modal travel on major roadways (highways and arterials) should be the focus for the Canada 511 system. The core of many existing telephone-based traveller information services is highway conditions reporting. As these systems migrate to Canada 511 and new systems are established, the following guidance should be considered.

Principles

There are five key principles associated with roadway content:

- *Regional Overviews or Summaries* – These are bulletins that allow users to get important information quickly (e.g. incidents, service disruptions, emergency information) without having to go through the menu system. Upon hearing the overview, the caller would be able to select the specific route or segment to obtain detailed information. Thresholds for determining what content is placed in a regional overview should be determined regionally.

- *Content is Route / Corridor-based* – Canada 511 services should provide information that is retrievable by route number (e.g. highway number, county road number, etc.) and / or name. In certain circumstances, if one or more principal roads run parallel, it may be acceptable to provide information on a corridor-basis. However, providing information on major roadways on a broad geographic basis (e.g. "roads in the northwest portion of the province …") is not recommended. When a route / corridor is operated by multiple agencies, these agencies should work together to provide an integrated description of conditions.

- *Limited Access Roadways and the Trans-Canada Highway System Should Be Covered by the Basic 511 Highway / Roadway-related Content* – Where applicable, deployers with operating responsibility for limited access roadways and / or portions of the Trans-Canada Highway system should include pertinent information within its Canada 511 system.

- *More Detail Needed in Urban Areas* – Given the increased traffic volumes and congestion levels in urban areas, even minor events could have large impacts on travel. Thus, greater content detail is recommended in urban areas relative to predominantly rural areas.

- *Content is Automated* – Whether the information provided to the caller is a human recorded message, or synthesized speech, this information should be stored and automatically provided to callers. There need not be any direct contact between callers and human operators to provide basic highway content.

Guidelines

Canada 511 will be operated as a system that provides telephone access to information via a pre-recorded "menu tree" that is navigated either by voice commands or by using a telephone keypad. By following a series of prompts, a caller reaches their desired destination in the system and either gets a recorded or digitized voice message.

This process is graphically illustrated in Figure E-2, with "Regional Overview," "Routes," "Segments" and "Content" serving as the key descriptors of the content guidelines.

- *Regional Overview* – While not applicable in all areas, regional overviews can provide the caller with either an emergency bulletin or a general, high-level of information on a region, helping to determine if they should seek additional detailed information by going to the routes / corridor and continuing through to the content.

- *Routes / Corridors* – When seeking highway information, a caller will first find the specific route (highway, county, etc.) number or corridor for which they desire information. As mentioned in the principles above, these routes may be retrievable via a route name or route number. Information on all freeway and limited access roadway (whether provincially operated or otherwise) should be available in this manner.

- *Segments* – The caller will then find the specific segment of highway or corridor that they are interested in, especially if it is a lengthy road. In non-urban areas, long routes should be sub-divided into segments. Segment specification is left to the deployer, but should follow logic with segments defined between major towns, landmarks or roadways. Deployers may also consider potential climatic differences that may help to define segments. In urban areas, segments should be defined between major interchanges and will generally be smaller in length than non-urban segments. Once the 511 service knows the specific section of highway that the caller is interested in, it then provides the caller a report of the relevant Basic Content.

- *Content* – For each segment, specific types of content should be provided. These should include:

    - Construction / Maintenance Projects – Current information on active projects along the route segment that may affect traffic flow and / or restrict lanes;

    - Road Closures and Major Delays – Unplanned events, major incidents or congestion that shut down or significantly restrict traffic for an extended period. In urban areas, information on all incidents and accidents, both major and minor, and congestion information along each route should also be provided;

    - Major Special Events – Transportation-related information associated with significant special events (fairs, sporting events, etc.); and

- Weather and Road Surface Conditions – Weather or road surface conditions that could impact travel along the route segment.

Emphasis and priority should be placed on those events that are current. The system should deliver current information first, followed by any planned events.

For each of these highway content types, it is necessary to provide details that enable callers to assess travel conditions and make travel decisions associated with a route segment. The content details are explained as follows, and Table E-1 illustrates which details are important to provide for each of the content types:

- *Location* – The location or portion of route segment where a reported item is occurring, related to exits and interchanges and / or common landmark(s). Also, if the information is for a location out of the current Canada 511 service area, this fact should be specifically noted.
- *Direction of Travel* – The direction of travel where a reported item is occurring.
- *General Description and Impact* – A brief account and impact of the reported item.
- *Days / Hours and / or Duration* – The period in which the reported item is "active" and possibly affecting travel.
- *Travel Time or Delay* – The duration of traveling from point A to point B, a segment or a trip expressed in time or delay a traveller will experience (where available).
- *Detours / Restrictions / Routing Advice* – Summaries of required detours, suggested alternate routes or modes and restrictions associated with a reported item (where applicable and available).
- *Forecasted Weather and Road Surface Conditions* – Near-term forecasted weather and pavement conditions along the route segment (where available).
- *Current Observed Weather and Road Surface Conditions* – Conditions known to be in existence that impact travel along the route segment (where available).

Figure E-2: Example Canada 511 Menu Tree

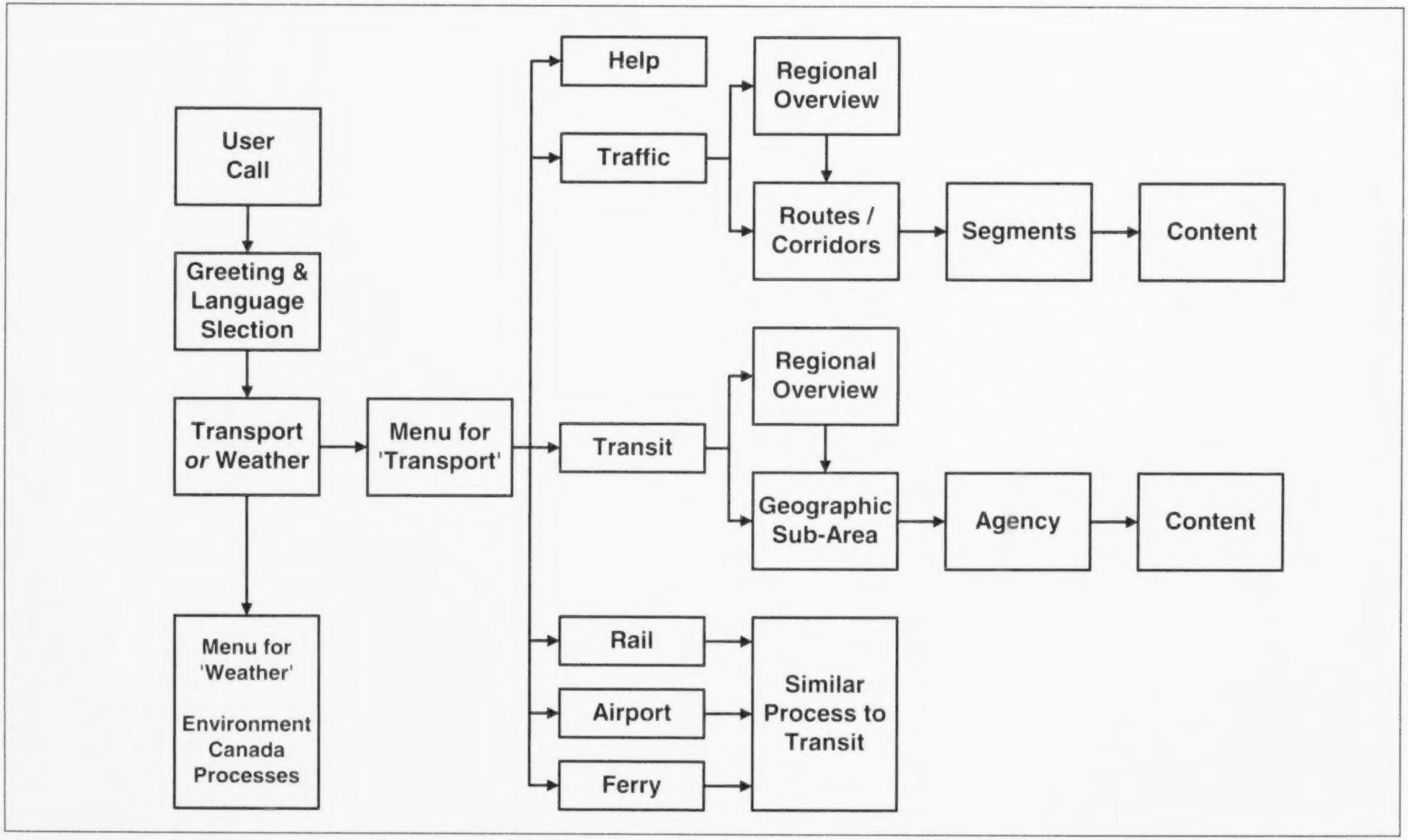

User Call
Greeting & Language Slection
Transport *or* Weather
Menu for 'Weather' Environment Canada Processes
Menu for 'Transport'
Help
Traffic
Transit
Rail
Airport
Ferry
Regional Overview
Routes / Corridors
Segments
Content
Regional Overview
Geographic Sub-Area
Agency
Content
Similar Process to Transit

Table E-1: Basic Content Details

	Geography		Content Detail							
Content Type	Non-urban	Urban	Location	Direction of travel	General description and Impact	Days / Hours and / or duration	Travel time or delay	Detours / Restrictions / Routing advice	Forecasted weather and road surface conditions	Current observed weather and road surface conditions
Construction / Maintenance	✓	✓	✓	✓	✓	✓	✓	✓		
Road Closures / Major Delays	✓	✓	✓	✓	✓	✓	✓	✓		✓
Major Special Events	✓	✓	✓	✓	✓	✓	✓	✓		
Weather and Road Conditions	✓	✓	✓		✓				✓	✓
Incidents / Accidents (Minor)		✓	✓	✓	✓		✓			

In addition to the above, there are certain content topics that have been demonstrated to provide value to ATIS users, but are recognized as difficult to uniformly implement. Thus, providing the following content is recommended to be included when launching services if possible, but is not explicitly considered part of the Basic Content package for highways. As services improve and evolve towards the long-range vision, these items should be incorporated into the service if not done so at the outset.

- Segment Travel Times or Delay – Particularly in urban areas, estimated travel times across a route segment have proven highly desirable by users. Travel times could be provided both in absolute terms ("segment travel time is 24 minutes") or in terms of delay from normal conditions ("segment travel time is delayed 5 minutes"). In the case of absolute travel times, it is recommended that travel times given do not exceed the speed limit travel time. In urban areas, multi-segment or corridor travel times would also be acceptable.

- Observed Weather and Road Surface Conditions – Observed or measured weather information may, when combined and processed with other road and weather data, form the basis in predicting and providing callers with segment or route-specific weather-related travel conditions.

3.1.3 TRANSIT OR PUBLIC TRANSPORTATION CONTENT

Regardless of the size and nature of a Canada 511 service area, there are likely to be one or more public transportation service providers in operation. In many cases, these public transportation operators already have established methods of communicating to the public about their services, including websites and customer service centres accessible by telephone. If properly utilized and coordinated with these existing communications methods, 511 can assist public transportation operators in better serving their customers and even attract new customers. The following guidelines should be considered when developing the public transportation information component of a Canada 511 service.

There are many different approaches that public transportation operators could take to implement their portion of 511 services. These guidelines are intended to maintain this implementation flexibility.

Principles

Information access via telephone has proven to be extremely important in transit customer service. The principal purposes for these services are for general agency and service information, communicating service disruptions and/or service changes, and trip planning. At the basic content level, Canada 511 should assist in providing callers with general agency and service information and communicating service disruptions and changes. Also, callers could be directed to where they can obtain more detailed information and trip planning.

The following five basic principles should be followed:

- *Information on All Transit Agencies in the Area Should Be Available* – Often, one or two dominant public transportation agencies exist in an area, but many more may exist that collectively provide a region's public transportation system. All of these operators should be accessible via Canada 511. In complex or large geographic areas, it may be necessary to subdivide areas before identifying specific agencies. As an illustration, the San Francisco Bay Area 511 service uses a voice recognition system that eliminates the need for nested menus to identify an appropriate transit agency. Their system asks callers to say the name of the transit agency that they want and if they do not know, then the system asks them to say the name of the city or county in which they are traveling. The 511 system returns with the agencies serving that city / county. If the caller still does not know which agency to say, the system takes the caller to the menu of the predominant local transit agency for the selected city or county.

- *Canada 511 Works in Conjunction with Transit Customer Service Centres* – Canada 511 is not intended to replace these operations, but to provide compatible and supplemental information, and to help callers locate these customer service centres (preferably with automated linkages to these customer service centres). Also, many smaller transit agencies do not yet operate transit websites or other forms of traveller information. In these instances, Canada 511 may be helpful in putting transit patrons in contact with that agency's call centre or office number.

- *Canada 511 Should Minimize Additional Customer Service Centre Overload Via Automated Messages* – Collective wisdom is that 511 system access could increase the number of callers seeking public transportation information. If Canada 511 were merely designed as a shorter number to access the service centre, this could significantly increase total calls to the customer service centre. However, 511 systems can and should be designed to provide automated messages described in these guidelines that will answer many callers' questions prior to seeking assistance from customer service centre operators. Ideally, thoughtful design will reduce the number of calls to be fielded by operators thereby allowing them to handle only the calls that require their expertise and increasing the total number of calls successfully managed. Canada 511 services must work in concert with the existing transit information call centres for it to be useful to the operating agencies.

- *Each Agency Is Responsible for Their Information* – To ensure information quality and agency autonomy, any information provided via Canada 511 for a particular public transportation operator must be provided or quality-checked by that operator. Callers will perceive agency specific information as coming from that agency, thus the agency must either directly provide or ensure the accuracy of the information.

Guidelines

As with roadway information, Canada 511 will allow users to navigate a "menu tree" by voice commands or by using a telephone keypad. By following a series of prompts, a user reaches their desired destination in the system and gets either a recorded or digitized voice message or is transferred to a live operator. In complex or large areas, the 511-service area may be segmented in sub-areas to simplify agency identification.

This process is graphically illustrated in Figure E-2, with "Geographic Sub-area," "Agency" and "Content" serving as the three key descriptors of the content guidelines.

- *Regional Overview* – As with road content, Regional Overviews may be used to communicate service disruptions that have major implications for travellers (e.g. subway shut-downs, commuter rail delays, etc.)

- *Geographic Sub-area* – In large or complex service areas, the area can be subdivided for navigating and providing transit reports. This subdivision should be developed locally and represent a logical characterization of the service area, such as by travel corridor, geography (e.g., "The Northwest Suburbs," the "Southeastern Part of the Province," etc.) or common name or nickname of a given sub-region (e.g., "The Island of Montreal"). Of course, Canada 511 services that utilize sub-areas in their menu will require callers to make at least two navigating commands to select their agency, thus care should be taken so callers can reach their desired report as swiftly as possible.

- *Agency* – Each agency that provides public transportation services in the Canada 511 service area or sub-area should be accessible. A single report for each agency is the basic guideline. Agencies have the option to add more layers and depth to their content. Once the Canada 511 service knows the specific public transportation agency that the caller is interested in, it then provides the caller a report of the relevant Basic Content.

- *Content* – For each public transportation agency, the Canada 511 system should have at least a single automated report that provides:

    - A Brief Description of the Agency's Operations – Quickly address the type of transportation services provided and the geographic area served by the system. For example, "ABC Transit agency, providing bus service in the greater XYZ region." This element must be brief to minimize caller wait time.

    - Major Service Disruptions, Changes or Additions – Provide information on temporary changes in services (specific routes, vehicles or access), alerts and / or summaries of scheduled service changes and details of extra services being used for current or upcoming special events.

    - An option to be transferred to the agency's customer service centre.

    - Convey the hours of operation of a customer service centre before transferring a caller to it, since it may not be operational at the time. Where system capabilities allow, dynamic menu options may offer this option only at times when available.

    - It is recommended that direct transfer options be established so that callers will directly transfer to an agency's customer service centre without hanging up, essentially creating a seamless system from the caller's perspective. Care should be taken to understand the call volume of the centres to which the Canada 511 system will transfer calls. It may be necessary to segregate outbound lines that the Canada 511 system will use for this purpose and allocate unique outbound lines for each centre. This will help avoid the traffic destined to one call centre from saturating the capacity of the Canada 511 system and therefore blocking any additional calls from being directly transferred to other centres.

- Other "Broadcast" Information at Discretion of Agency – Static information such as fare and pass information, real-time parking availability information, and the agency's Internet address are a few of the examples of the information an agency could provide via automated messages on Canada 511.
- Agencies may add more "layers" to reports at their option.

For public transportation agencies with large or complex operations, a single automated report may either be too long and cumbersome or potentially confusing for callers. Therefore, basic content as described in the following section may be logically segmented (e.g. by mode, by region, or by road segment).

In addition to the above, *Regional or Corridor Specific Transit Information* is a content type that has value for public transportation users, but is recognized as difficult to uniformly implement. The basic content guideline for public transportation indicates that each public transportation agency should have automated reports. As technical capabilities and information collection techniques improve, it is desirable in areas served by multiple public transportation providers to allow Canada 511 callers to request information based on location, instead of by public transportation provider. Infrequent users may not be familiar with the transit properties that serve their area. In these instances, the following features would provide benefit:

- The enabling of a search or sort option by 'region or corridor' in addition to 'by agency'; and
- Allowing users to request the availability and status of services based on location (not agency).

Thus, providing *Regional or Corridor Specific Transit Information* is recommended to be included when launching services if possible, but is not explicitly considered part of the Basic Content package for public transportation. As services improve and evolve towards the long-range vision, these items should be incorporated into the service if not done so at the outset.

3.1.4 WEATHER-RELATED-TO-TRAVEL CONTENT

Canada 511 will include a wide range of explicit 'weather information content' for a variety of users, such as maritime, aeronautical, and agricultural users (amongst others). Because road conditions and weather information may significantly impact travel delay and safety, there are a number of weather-related information products that would benefit multi-modal road users. This section describes these products and their related design principles.

Principles

The overriding basic principle for providing weather information is as follows: *"If weather will impact a person's trip, then they should be alerted to that possibility."* Conversely, if the weather will not impact a person's trip, then to minimize message length, weather and road conditions are not reported.

Weather information is a basic component of 511 information provisions and it is recommended that deployers provide travellers whatever weather information is available to them that may affect travel. Ideally, this will include information on roadway surface conditions (both observed and forecasted).

Potential sources of such information include:

- Weather information provided by Environment Canada and provincial authorities; and

- Weather information provided by private sector value-added meteorologists;

Travellers need prioritized hazard information that describes the anticipated impacts of both current and forecasted weather conditions. Deployers are advised to provide only information pertinent to specific hazards. This is intended to keep message lengths short. These reports should be segmented by route or trip where appropriate.

This also includes the weather impacts on transit operations and patrons – on guideways, railways, pathways – and related passenger information such as wind chill effects on those waiting at bus stops. Deployers may look to various market packages in the ITS Architecture for Canada for the origins for this type of information including: Environment Information Collection; Weather Information Processing and Distribution; Winter Maintenance; Maintenance and Construction Vehicle Tracking; Roadway Automated Treatment; and Maintenance and Construction Activity Coordination.

The gathering of weather data for maintenance efforts can be a prime source of information to be shared with travellers via 511.

There may be specific geographic or climatological locations where weather events have more pronounced or seasonal impacts (e.g. mountain passes in the winter months). In these cases, it is recommended that the 511 system serving those areas devote particular attention to these localized areas and conditions.

Guidelines

Weather information on a 511 system can range from a regional alert (e.g. hurricane, winter storm, etc.) to a route specific observation or alert (e.g. low visibility, icy pavement, high winds, etc.). Deployers should include any available weather-related information that could impact a person's travel and attempt to package and deliver the information in a consistent manner. The two keys to weather are relaying impacts and providing navigational references to aid the traveller.

- *Regional Overview* – When extreme weather conditions are present or forecast, it is recommended that an overview be presented before the caller accesses any other menus, such as route or transit information. This information could be presented at a high level in the menu, similar to the Regiona*l Overview* provided for the Roadway Content. This could be used for smog alerts, extreme weather alerts, or even natural disasters such as floods.

- *Weather Related Impacts* - When weather conditions are a cause of accidents, incidents and delays, it is recommended that this be noted on 511. For example, "There is a ten-minute delay at the bridge crossing due to high winds". This is at the heart of weather information provided on 511. In other words, it is not direct weather that is important to 511, it is the related impact that is important.

- *Navigation Reference* - Weather information should be presented with a navigation reference such as: road segment; cities / towns; milepost; exits; major intersection / interchange to major intersection / interchange; landmarks; and rest areas.

Wherever possible, the following content is recommended for inclusion in the launch of Canada 511 service. If not possible at launch, the service would ideally evolve towards these long-range service delivery standards:

- *Customer Feedback* – Callers can select a menu item that allows them to provide comments on the service, or can be used by the deployer as a surveying tool.
- *Format for Depicting Road Condition* - The Society of Automotive Engineers (SAE) ATIS standard / message sets are appropriate for the sharing and presenting of weather information on 511. The ATIS and Traffic Management Data Dictionary (TMDD) – standards for centre-to-centre communication – committees are coordinating message set structures and coding to ensure commonality. The most current draft of the ATIS message set that deals with weather and links in both Abstract Syntax Notation number One (ASN.1) and extensible Markup Language (XML) is available within the U.S. 511 Deployment Assistance Report No.6 (http://www.deploy511.org/docs/511-dar6weatheenviroservices.doc). Many of the elements come from National Transportation Communications for ITS Protocol (NTCIP) - Environmental Sensor Stations (ESS) or from TMDD when they do not come directly from the ATIS standard.
- *Observed vs. Forecasted* - 511 users want to get more timely, accurate and relevant forecasted information than they might on the nightly news or radio. To supplement actual observation, there is a need for route-specific short-term weather forecasts (preferably looking forward up to three hours) describing the changing conditions that are important to travellers.
- *Short, Live Update Frequently* - It is recommended that weather condition information on 511 be updated frequently so that the information presented is the best available at the time. Weather forecasts and current conditions are available through a variety of means (RWIS, radar, etc.) and in a number of time frames. 511 system deployers should endeavour to deliver updates to forecasts as frequently as practicable.
- *Road Surface Conditions* - Road conditions can change swiftly. Atmospheric and pavement sensor data can provide indications of conditions affecting traffic flow and roadway safety (e.g., low visibility, slippery pavement). Environmental sensor station (ESS) data are typically collected by Road Weather Information Systems (RWIS) deployed by maintenance managers. These managers can supplement observed data from ESS with information on maintenance operations (e.g., snow plowed, sand applied) to provide data on actual surface conditions. Route-specific road condition data are currently provided by most provincial authorities. Deployers of 511 systems should coordinate with provincial and local agencies to access existing data from advanced road condition reporting systems.
- *Rural Considerations* - In rural areas, it is important to provide weather information on road segments before logical decision points along a route. For example, if there is snow in a mountain pass, and chains are required, this needs to be conveyed to travellers well in advance. In this way, the traveller may put chains on their tires, use an alternate route, or reschedule their travel.

3.2 Optional Content

The implementation of a 511 system presents the opportunity to provide travellers with all of the Basic Content described above, and a significant range of 'optional', or additional services that benefit users and suit local needs. Of course, this optional content is up to the discretion of the system deployers and can include any additional content supported by the public sector and / or private sector partners. Based on local demographics or geography, some of these optional content categories may be expected by local callers. Agencies considering deploying a 511 system should factor in these expectations into their service planning process.

In providing additional content implementers have essentially two choices:

- *Go Deeper* – A richer set of basic services could be provided via 511. For example, information on more routes (e.g. more urban streets) could be added to the Basic Content. Or more detailed content could be provided on public transportation services. Another possibility is that an agency or region could choose to greatly improve the accuracy, timeliness or availability of their information, improving its quality but not adding further content.

- *Go Broader* – Many additional content categories have been considered for inclusion in 511 services, but are not part of the basic content package.

The following list is representative, but not complete, of the possible optional content categories. Implementers may choose to implement these and other types of content. Note that these are provided for information only, and that these traveller information products are not considered Basic Content.

- *Tourist Information* – Specific information about local tourist attractions, tourist information centres, convention and visitors bureaus, etc. This information could be provided through recorded messages or transfers to live operators.

- *Special Events* – Information pertaining to major special events occurring in a service area. The information may go beyond transportation-related information to include event-related information such as times, locations, event descriptions, etc.

- *Parking* – Parking location and possibly parking lot status information.

- *Local Information / Points of Interest* – Information such as restaurant locations, gas stations, taxis, etc. This could be extended to include reservation services.

- *Interregional Information* – Information pertaining to transportation conditions in other, perhaps adjacent, regions. Examples include extension of an inter-province travel corridor (e.g. Toronto-Montreal), a major city in an adjacent province (e.g. Ottawa-Hull) and multi-province storm information (e.g. the Atlantic provinces). Depending on how your “region” is defined, this may be “basic” content accomplished by a call or data transfer.

- *Driving Directions* – In a voice-activated 511 service, callers can provide their location and their desired destination and obtain driving directions. These directions could be based upon typical or real-time conditions and / or can include estimated trip travel time if such information is available.

- *Public Transportation Trip Itinerary Planning* – In either a voice activated or operator-assisted environment, callers can obtain transit trip plans that could include routes, transfers, costs and trip times.

- *Multimodal Routing and Trip Planning* – Integrating information from multiple modes (highways, transit, rail, air, etc.), callers can obtain a complete trip itinerary that is as efficient as possible, regardless of mode.

- *Incident Reporting* – 511 is intended primarily as an information source for travellers. However, systems can be designed such that callers could report incidents through 511 as well, either by communicating directly with an operator or by leaving a voice message.

- *Local Transportation Facilities Information* – Callers can obtain information about major transportation facilities in the 511 service area, including airports, train stations, ferry, freight, and cruise ports. Information could include parking and traffic conditions associated with the facilities.

- *Local Transportation Services Information* – Callers can obtain information on transportation programs in the 511-service area, such as carpools and vanpools.

- *Concierge Services* – Operators can provide any of the above information to callers. These operators could also handle additional services, such as reservations and purchases.

- *Personalized Services* – Callers can provide profiles of their normal travel patterns and the system, by recognizing the phone number of the caller, or some other method, can provide a complete report along the caller's route (e.g., the conditions on a commuter's complete normal route), without requiring callers to locate and review reports on multiple route / corridor segments.

- *Caller Reports* – Callers can report conditions that require a response by the transportation agency, such as hazardous road conditions, litter, dead animals or potholes.

- *Express Mode Menu* – Callers who are familiar with the system may be familiar with shortcuts using their touchtone phones or vocal shortcuts. Accessing the Express Menu would allow users to access information much quicker than by going through the "normal" menu.

In examining the addition of optional content, system implementers should be careful to design a system that complements – rather than diminishes – the impact of the basic content services. Also, each of the options listed above may require extra and complex interactions to provide the information via 511. As these are intended to be illustrative examples, assessments of the relative practicality or merits of each optional content category are not provided.

3.3 Content Quality and Consistency

The accuracy, timeliness and reliability of information on 511 is an important issue for the 511 community and users as well. In an increasingly advanced information society, callers are generally accustomed to high quality information. 511 content must be no different. In 2001, ITS America, in its national consumer research on 511, determined that "those surveyed said that if they used 511 and found the information to be inaccurate in their first few uses, they would be unlikely to give the service another chance."

Therefore, 511 implementers must focus on the following five quality parameters and must ensure they are satisfied with the following parameters early in the development stages:

- *Accuracy* – Reports are recommended to contain information that matches actual conditions. If the system reports construction events that are not occurring (or worse, does not report a construction event that is occurring) or a road closure is not reported, callers will come to distrust the information provided. If inaccuracies persist, callers will discontinue their use of 511.

- *Timeliness* – Closely related to accuracy, information provided by 511 is recommended to be timely to the greatest extent possible in accordance with the speed of changing conditions. While it is recognized that non-urban areas may have more difficulty collecting, inserting and updating information quickly, is recommended that every attempt be made in both urban and non-urban areas to update information as soon as there is a known deviation from the current route segment or service report. Thus, the timeliest reports are based on changing conditions and not on regular interval updates.

- *Reliability* – Often, transportation management systems are staffed during limited working hours. But travellers use transportation infrastructure 24 hours a day, 7 days a week. In fact, often the most challenging travel conditions are at night and on weekends. Methods must be developed to provide callers with a reliable stream of information 24 / 7.
- *Consistency of Presentation* – It is recommended that reports use the same, or similar, terminology to describe conditions. Lack of consistent terminology leads to misunderstanding and confusion amongst callers and consistent terminology will make the system more usable as users move from system to system. The use of existing and evolving standards, such as the TMDD and SAE J2354, for messages will enable this consistency.
- *Relevancy* – The information that is provided needs to be relevant to the caller given (a) their location, (b) their modal choice, and (c) the actions that they may need to take as a consequence of weather, road conditions or service disruptions.

The importance of consistent and high quality information cannot be overstated. The quality of basic content information will largely determine the success of 511. Wherever possible, 511 services should provide callers with the ability to gauge the quality of the reported information by 'qualifying' the reports where appropriate (e.g. "There is a report of an avalanche…" vs. "An avalanche has occurred…"). This will enable travellers to properly weigh the information in their decision-making.

The Need for Increased Data Collection

The deployment experience in the United States has revealed a common public misconception – that transportation departments and agencies already possess all of the data and information necessary to provide a quality 511 service. While the concept of dialling an easy to remember telephone number and providing quality decision-level information to the traveling public is easy to grasp, the complexities of the systems behind the service are not.

The deployment of roadside detectors, wireless communication devices and other systems is key to the development of a nationwide 511 service. In turn, a quality 511 service can help attract funding for further investments in detection. The American experience has shown that many states are presenting 511 as the "face of ITS" to elected officials and the public, and are using 511 as a way to increase the coverage area of detection and systems. The more detection and base level of technological investment there is, the better the 511 service, and the more consistent the level of information provided. If every province or region has a similar level of detection and integrated networks for collection of information, then the products could also be similar.

Emergency Alerts / Broadcast Messages

Since the early U.S. deployers launched their 511 services in 2001 and 2002, most have found additional ways to use this valuable resource. Some of these ways include broadcast messages in emergency situations (including AMBER Alerts), and working in conjunction with traffic and incident management to achieve better network management.

Broadcast, or "floodgate" messages, can be a critical tool for disseminating information to the traveling public during a major incident, be it weather, event or security-related. Broadcast messages can be implemented in various ways, but the two basic types are uninterruptible and interruptible (meaning a caller can override or terminate the message).

In times of emergencies, uninterruptible broadcast messages can deliver a brief, important message at / or after the greeting of a 511 service and terminate the call, thus creating a 511 system that has short call durations and is able to disseminate the most critical information to all callers and nothing else. The uninterruptible message relating to a lesser service disruption with a large impact requires a caller to hear the whole message before they may continue to additional, selectable information. Other forms of the message type are broadcast by service, mode or geographic area. Interruptible messages can be placed in the same areas of the system, but are typically used for less important information.

Virginia DOT (VDOT) found that 511 is a welcome asset during incident and traffic management situations. The 511 service is being used in conjunction with permanent and portable changeable message signs (CMS) to relay critical information to travellers during major incidents, typically hazardous material spills that can close an Interstate. Because CMS are limited to three lines of text on three panels, multiple detour listings and the description of complex situations is generally not possible. The CMS convey the necessary information as they normally would in these situations, but they also prompt travellers to dial 511 for additional information. In one situation, VDOT used CMS up to 100 miles from an incident to alert drivers to dial 511 where they received information on up to three detours depending on their desired destination. VDOT has documented that by using the CMS and 511 together, call volumes to the service doubled almost immediately.

The AMBER Alert is a child abduction response system that uses radio, television, changeable message signs and emergency broadcast systems to disseminate information about kidnapping suspects and victims soon after the crime is committed. The system is designed to solicit aid from the public to look for victims by providing known details such as descriptions of vehicles and individuals. Recently, 511 services have become an additional tool for disseminating AMBER Alert information quickly and completely, and more safely than long CMS messages. A number of deploying agencies (including Minnesota and Utah) are now using less detailed AMBER Alert messages on their CMS and prompting drivers to dial 511where they can receive accurate detailed information about an event or emergency situation. This process was recognized by the AMBER Alert representatives in Utah with the designation of the 511 system as a "certified" source of AMBER Alert information.

Time Stamping

Callers expect timely information. Time / date identifiers that provide callers with a sense of reliability and accuracy of the information provided are considered desirable by deployers and customers. Time stamping will provide the caller with a sense of accuracy, which may encourage repeat use of the system. This is particularly important for those systems that are not updated as conditions change, but based upon a periodic schedule. In these instances, the updated schedule should also be communicated to callers in association with the particular message.

Tailoring Content to Telephonic Media

The tailoring of content to telephonic media poses some issues. Often, the data available for inclusion in a 511 service is from a traffic management centre software package or data available on an agency website. Reading information on a website or looking at a graphical user interface (GUI) is a much different experience than listening to the same information over the telephone.

To convert these types of data into usable information for dissemination through the telephone, a deployer should try to eliminate the use of free-form text. This may require a database modification forcing operators to use pull-down menus where blank text boxes were formerly used. Since most operational 511 services in the United States deliver information using concatenated (tokened) speech or text to speech (TTS) technologies, Voice extensible Markup Language (VXML) has become the de facto standard for interpreting and delivering the information. This means that most data feeds to 511 are being provided in an XML format.

Another way that U.S. deployers have provided content via telephone is to treat the medium as if it were an on-demand radio report, complete with recordings made by professional voice talent. The Central Florida 511 service covering I-4 disseminates its information in this manner. Most travellers are accustomed to hearing radio-style traffic reports and have made the system one of the most heavily used in the country.

The design of the system and how the caller will interact with the menu options must also be taken into consideration. This issue should not be taken lightly, for a poorly designed system will lead to unhappy users and a decline in usage. A quality design is best achieved by using experienced personnel and thorough system testing. It is difficult to design a comprehensive, easy to use automated phone system. However, this can be achieved by paying close attention to the lessons learned in deployments to-date.

Recognition of Regional Variation

While providing consistency from system to system is vital, meeting travellers' needs should always be the top priority. However, those needs change from place to place and from caller to caller. Sometimes variations are by a deployer's choice, and other times they are due to a lack of quality information or available resources.

Another reason why variations exist, or why information needs vary, is that the same caller may have completely different needs depending on the trip type, season or geography.

For example, Joe, a daily commuter in the Vancouver Area may dial 511 regularly to check on his commuting routes to and from work. On the weekend he may need to know information on available transit service to General Motors Arena. The following week, while driving along the Sea to Sky highway on vacation, Joe may be most interested in the weather-related road conditions. While daily commuting and transit service to a hockey arena may not be relevant through the mountain passes, mid-winter road conditions are vital.

4. SERVICE DELIVERY GUIDELINES

4.1 Phone System Guidelines

Telecommunication systems are the access and delivery points of all 511 services. Guidelines for these systems are more general than the content guidelines, since each telecommunication system can be established differently behind-the-scenes and still deliver identical information in a near identical manner to the user. It is also anticipated that with operating practice, these guidelines will evolve based on additional customer and user input.

4.1.1 PHONE SYSTEM ELEMENTS

The key telecommunication elements of a 511 service allow the system to accept calls, interact with the users, process queries and commands and provide useful information back to the callers. Each of these system elements must be properly planned and must function consistently to have a successful 511 service.

Accepting Calls

The service should be capable of accepting calls from both wireless and landline phones, and do so without extensive delay to the caller. The call should go through and be routed to the proper answering point, be it a local or toll-free number. See additional related information on System Access Quality and Call Routing in later sections.

User Interface

To most callers, the user interface is the system. For most 511 services deployed today (i.e. in the United States), the interface is a voice recognition system, ideally with a touchtone back up. If the interface does not work properly (e.g. does not recognize commands), consistently or is cumbersome to use, then the 511 service is not meeting the needs of the caller, no matter what the quality of the underlying information. The User Interface Guidelines can be found in **Section 4.1.2** below.

Output – Providing Information

Information should be provided in a succinct message, which conveys all the necessary information to allow the caller to determine if an action needs to be taken on the caller's part to improve the quality of their trip (reduce delay, avoid hazardous conditions, etc.). The result of the command, or query, should be delivered in a consistent voice, in a consistent format, and should be of high-quality.

4.1.2 USER INTERFACE GUIDELINES

Based on consumer focus groups conducted within the United States, the initial greeting should be very short, such as "Welcome to (metro area's, region's, or program's name) 511 for Travel Information." Customers expect a short verification that they dialled correctly, but comment that they do not want a lengthy introduction or long formal enunciation of agency names. Supplemental information such as website addresses or complete help instructions should not be included in the initial greeting, but provided through menu selections, or within a concluding message. Some services name the sponsoring departments or agencies to add credence to the information being distributed. In the cases of major emergencies, an uninterruptible emergency message may be provided prior to, in place of, or just after the normal initial greeting.

It is recommended that implementers use voice recognition as the primary user interface. For voice activated systems, the following top-level commands should be used when a system has the relevant information available: "Highway Information", "Transit Information", "Airport Information", "Rail Station Information," "Ferry Information" and "Help." Top-level menu commands beyond the basic services are acceptable. Care should be taken when adding additional top-level commands to select descriptive terms and not to conflict with the basic terms noted here. It is possible that the specific top-level menu commands may change in future updates of the guidelines based on information collected through user input and system evaluations.

Although discouraged as a primary user interface means, systems that utilize keypad entry for navigation should use the following top-level menu tree: 1 for "highway information", 2 for "transit information" and 9 for "help using the system". Although not defined as part of the basic content package, 3 should be reserved for "airport and other major terminal and transportation facility information." Systems that use both keypad entry and voice activation should allow callers to press or say the top-level number ("press or say 2 for transit information").

Overly complicated menu trees should be avoided. Systems should not require the user to make more than 3 entries or replies before providing the desired information. At each level, no more than 6 options should be listed. Systems should allow users to request that messages be repeated and to "go back" in the menu tree.

"Shortcuts" are used often by repeat callers who know what element of information they are seeking. The use of shortcuts is encouraged and has been employed in many systems. It is possible that a future update of these guidelines could include specific guidance on shortcut methods if some are clearly better than others.

4.1.3 SERVICE QUALITY GUIDELINES

The quality and availability of the 511 service is important to attracting and retaining users. Users receive no benefit from a service that contains accurate, timely and relevant content, but is inaccessible. These guidelines address the system access quality and the hours of operation of a 511 service.

System Access Quality

In order for the telephone system to have the ability to reliably and quickly answer calls, a 511 service should be sized to accept all calls for the 90th percentile peak hour load[1]. If live operators are utilized, or connected to, as part of a 511 service, the 90th percentile wait time should not exceed 90 seconds and callers should receive indications that they are on hold. 511 services should have an availability to callers of 99.8%, inclusive of maintenance and peak loading. This translates to the system being out of service less than 18 hours a year – primarily consisting of off-peak maintenance activity.

System performance against these parameters should be measured and monitored. Most implementers (i.e. existing U.S. installations) are meeting these guidelines by employing an application service provider (ASP) that operates the telephone answering ports (phone lines) and uses a voice recognition software package, which is all located off-site (even across the country in some cases). By contracting this portion of the 511 service, or all of it, an implementer can benefit from the ASP's existing infrastructure, allowing the system to easily handle enormous peaks in call volumes. Alternatively, an ASP may be contracted to handle 'overflow' situations when the deploying agencies system cannot handle a 'peaking' number of calls.

In the United States, most 511 deployments have been located within States that started from a relatively low-call volume ATIS. Consequently, most deployers have seen a 300 – 500% increase in call volumes simply by converting an existing 7 or 10-digit travel information line to 511. For example, Southeast Florida experienced a significant increase in call volumes by converting an existing travel information phone number to 511. The system used to receive 15,000 calls per month, however, with 511 as the access number, the system now receives more than 100,000 calls per month – an increase of over 650%. For some 511 systems, major events (weather, incidents, etc.), especially in conjunction with peak travel times can cause call volumes in a single day to exceed the call volumes of an average month.

Hours of Operation

511 services should be available to travellers 24 hours a day, 7 days a week. It is recognized that systems will not always be "operated" 24 / 7. In instances when the system is providing static, pre-recorded messages, systems should inform the caller that it is outside normal operating hours.

Despite being the primary target audience, consumer research conducted in 1990s revealed that traveller information systems solely designed for the weekday commuter and only operated during specific business hours were of limited use and applicability. Travel information is just as important to someone traveling late at night or during the weekend. With an automated system, receiving inputs from multiple sources and using non-recorded messages, a 511 service can operate around-the-clock. To date, all 511 services deployed are accessible 24 hours a day.

4.1.4 MONITORING GUIDELINES

For the purposes of assessing the benefits of the Canada 511 system, and measuring growth, access, and types of desirable services, Canada 511 deployers should maintain usage statistics for their system. This usage information is valuable to the deploying agency as well as the broader network of Canada 511 system deployers, in system planning, marketing and outreach activities. These statistics will also help deployers gauge the consumer response to their service and enable comparisons between like systems.

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[1] 90% of the time (21.6 hours of the day, 7884 hours of the year, etc.), a 511 system should have the system capacity to handle 100% of incoming calls. This guideline recognizes that extreme conditions will occur periodically that will increase demand well beyond "normal peak" calling. In those circumstances, it is in not unreasonable to ask callers to re-dial or wait to access the service.

Typical usage statistics that are currently in use within the United States (and that are collected monthly) include:

- Calls per month
- Peak call day
- Peak call count
- Peak call day reason (i.e., major storm, holiday travel, incident)
- Peak call hour
- Peak call count
- Peak call hour date
- Peak call hour reason
- Capacity utilization
- Number of Dropped Calls
- Average call length (seconds)
- Total minutes per month
- Percentage of wireless calls received
- Percentage of landline calls received
- Percentage of calls in selected categories, including:

Traffic
Transit
Weather
Construction
Ferry
Services
Road Conditions
No Selection
Airports
Bicycling
Commuter Incentives
Paratransit
Carpooling / Vanpooling
Spare the Air
Transfers

Currently, all U.S. 511 deployments report usage information to the U.S. 511 Coalition so that the Coalition may track the progress of deployments in the U.S.. Only a few are able to report all the information desired above. The following describes the type of information needed and a rationale for providing it:

- *Calls Per Month* – the total number of calls to the 511 system. This information is gathered as of the date of the launch of 511 services by the deployer. Some systems have an official public launch ceremony while others choose to slowly roll out the service as carriers reprogram switches.

- *Peak Call Day, Count and Reason* – the day of the month that the system received the most total calls, the number of calls received that day and the reason for the influx of calls. Over time, the peak call day usually has been caused by a major incident or weather phenomena.

- *Peak Call Hour, Count, Date and Reason* – the hour of the month that the system received the most total calls, the number of calls received, the date and the reason for the influx of calls. Over time, the peak call hour usually has been caused by a major incident or weather phenomena, but it is not necessarily on the peak call day.

- *Capacity Utilization* – this is determined by the peak number of simultaneous calls divided by the maximum number of simultaneous calls. In some cases, capacity utilization can exceed the maximum number of simultaneous calls especially when using a shared off-premise facility. Capacity utilization can assist a deployer in making decisions to expand or contract the maximum number of simultaneous calls.

- *Number of Dropped Calls* – the total number of calls to 511 that do not receive information or make a menu choice. A large number of dropped calls may indicate problems with a switch, carrier or port(s) / line(s).

- *Average Call Length (Seconds)* – the total length of all calls in seconds divided by the total number of calls to 511. An increasing average call length may indicate that consumers are having problems accessing information. Deployers usually see their average call length decrease when switching to a voice response system and as users become familiar with the menu structure and shortcuts.

- *Total Minutes per Month* – the total number of minutes that calls to 511 were connected to the system. The rationale for total minutes per month is similar to average call length above.

- *Percentage of Wireless and Landline Calls Received* – the number of calls received via wireless and landline calls divided by the total number of calls. These percentages are useful in determining the effectiveness of 511 marketing campaigns as new billboards and road signs should see an increase in wireless usage and bill inserts may increase landline usage. A decrease in wireless usage may indicate that there is a problem with switch programming or call routing.

- *Percentage by Category* – these categories may be based on actual menu choices for systems around the country and enable comparisons between like systems. An increase in the 'No Selection' category may indicate the same problems as the 'number of dropped calls' noted above.

It is anticipated that over time, and with further operating experience with the Canada 511 system, further guidelines focussing on key system indicators will be developed.

Deployers should also conduct periodic customer satisfaction surveys to monitor the quality of the Canada 511 service operation, and to obtain insight into customer needs.

4.1.5 CALL TRANSFER GUIDELINES

Call transfers play an important role in providing a comprehensive and useful 511 service.

Having the ability to transfer to other call centres (with operators), or automated service providers is important in providing a comprehensive 511 service and meeting user's needs. These transfers can be to other modal agencies, tourism centres or enhanced or premium services.

There are multiple reasons to provide such transfers, including cell tower and switch location issues, cross-border travel and services not typically provided by the implementing department or agency. For example, a provincial transportation ministry may be the lead developer and operator of a 511 service and desire to provide information on city-based transit systems, coastal ferries or tourism information. Instead of adding functionalities to the ministry database, the callers requesting such information can be transferred to the responsible agency or service provider capable of maintaining accurate and timely information. This may also apply to other provincial or U.S. 511 systems.

As an alternative, some U.S. states have chosen to eliminate the issue entirely by banding with bordering states and seeking a single service provider. This allows the call to be transferred internally within the structure of the overall, multi-state service. However, other U.S. states, especially some of the earliest deployers, are working with bordering states to determine the best way to handle call transfers. This issue is further addressed later in **Section 4.3.1 - 511 System Interoperability**.

Deployers should use call transfers to provide a comprehensive 511 service when appropriate and / or necessary either functionally or financially. When transferring the caller out of the 511 service, the caller should be notified that they will not be able to return to the 511 service. If the caller wants to transfer back to the 511 service, he/she may have to hang-up in order to access the service. This could sometimes negatively impact the user's acceptance and use of the 511 system. As an option, and in cooperation with the other system operator / authority, the system could be designed so that the caller can be transferred back from the receiving service's menu tree. This applies to transfers across borders or between modal systems and service providers.

For example, because North Carolina DOT and VDOT share a long contiguous border and have multiple wireless carriers with switch and cell tower location issues, the two states have agreed to offer their 511 callers the opportunity to transfer to the neighbouring state's 511 service. Virginia will be a menu option in the NCDOT 511 service and North Carolina will be a menu option in the existing Virginia service.

4.2 Call Routing Guidelines

A successful 511 service has seamless and reliable call routing and these should go virtually unnoticed by the user. Simply put, the call goes through and the call gets answered. The early deployers (i.e. U.S. installations) have proven that call routing and carrier coordination is not a trivial matter, be it for landline or wireless carriers.

4.2.1 511 CALL ROUTING BASICS

The routing of the 511 dialling code is completed in two basic ways – landline and wireless. When 511 is dialled on a landline phone, the call is received by the telephone company central office and translated into a 7 or 10-digit number, where the call is answered by an automated 511 system.

For wireless calls when 511 is dialled at the handset, the call is received by a cellular tower and carried to a switch where the 511 code is translated into a 7 or 10-digit number, where the call is answered by an automated 511 system. Each of these routings have various cost implications associated with them.

In either of the above cases, the translation should be seamless to the caller. The caller dials 511 and the call is routed to whatever number will take the call to the information service.

Routing charges associated with translating one phone number to another for the purposes of connecting a call to the 511 service generally come in two varieties:

- **511 Translation to the Designated 7 or 10-digit Number.** This translation must occur, as all systems will reside on the phone network as a "regular" phone number.

- **Toll-free Translation to the Designated 7 or 10-digit Number.** This translation occurs for each call made via a toll-free system. For instance, 511 calls in a rural portion of a state are routed to a toll-free number that is then translated to a local number in the urban area where the 511 system resides. This approach is common as it enables the call to be free to the caller and minimizes the cost of the call to the 511 service provider.

4.2.2 CALL ROUTING COORDINATION

Call routing coordination primarily consists of number allocation and service coordination. Implementing the 511 dialling code requires negotiations with local telephone companies. Costs for "turning on" a 511 code are highly variable and depend on, amongst other things: whether there is a tariff in place for 511; the implementer's use of a local number, a toll-free number or both; the implementer's ability to work with local wireless carriers to match landline carriers in implementing the 511 code; and, perhaps, using a separate "back-door" number for wireless calls in order to avoid any toll-free or tariff charges based on the configuration deployed[2].

Carrier coordination is one area where most deployers experience their biggest delays in developing a 511 service. Many deployers discovered that a carrier could require up to six months to complete the necessary discussions, paperwork and perform the required programming to properly route calls. Some deployers have been forced to launch systems without having all major carriers on-board. While business decisions made by some carriers have impacted access timelines, deployers have also run into issues due to underestimating the time and level of effort required to incorporate all carriers into the 511 service.

4.2.3 511 SERVICE ACCESS

For many potential users, access to 511 can depend on how the deployer addresses key regulatory issues, including bilingual services and access for those with disabilities. All of these access-related decisions need to be considered in the planning stage and implemented when and where appropriate.

Landline and wireless phone services are the primary access points to 511 systems and will continue to be for the foreseeable future. Most deployers assume that their 511 service will be used primarily by people on the move utilizing wireless phones. In reality, the limited data available shows that there is more of a balance between commuters and pre-trip calls. Therefore, access via landline phones is very important. The ARTIMIS system in Cincinnati / Northern Kentucky (an urban system) and 511 Virginia (a rural commuter-shed system) consistently report that calls from landline phones make up about 55% of the calls each month. Based on this limited data, a deployer should recognize that choosing to launch a wireless-only service will greatly reduce the utilization of the system and, if left in that access mode too long, may discourage people in the future from placing a landline call to the system once the system can receive those calls. Engaging both landline and wireless carriers as early as possible in the planning process is critical.

When designing a service for the general public, the lead agency must be cognizant of the various federal and provincial legislative mandates and requirements to ensure access to transportation information by all citizens. This includes reviewing any legislation or policies (some are departmental) that will impact the service's architecture and design. Such consideration may include, but not be limited to multi-lingual needs and services for customers / callers who may have a hearing disability.

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[2] The use of a Back-Door number is only beneficial when a wireless carrier's calling plans allow for local calling over a wider area than a landline carriers. For example: In the San Francisco Bay Area, landline calls from Oakland to San Francisco are considered toll calls. For wireless callers, however, these calls and those for a considerably wider area as well, are considered local calls and no toll charges apply. Using a Back Door number for wireless can thus alleviate some of the local 511 tariff (per call) charges, as well as any toll-free charges that might apply.

4.3 Operating Principles

There are a number of principles that have been demonstrated to be keys to the successful development, deployment and operation of 511 services. The following section identifies six principles that each deployer must give serious consideration: system interoperability, privacy, system architecture, standards, evaluation and customer satisfaction and awareness.

4.3.1 511 SYSTEM INTEROPERABILITY

Interoperability deals with how 511 services with adjacent operating borders interrelate to give callers seamless information. This issue is relevant primarily to roadway and weather content as it is not uncommon for callers to seek information on what is happening in an adjacent 511 system, be it provincial, municipal, or national. For example, there are strong travel demands on Highway 401 between Ontario and Quebec, and on Highway 99 / Highway 5 between British Columbia and Washington State. It is reasonable to expect travellers to seek similar information for all the jurisdictions through which they will travel on any one particular journey.

Without either being able to incorporate information on those roadways or, at a minimum, transferring the caller to the neighbouring province's or region's 511 service, the caller may not have information on the road ahead. Without system interoperability there is merely a patchwork of unconnected 511 systems scattered around the country and this does not meet the national vision for 511.

With the overlap and varied boundaries of agencies, regions, travel patterns and the unknowns of cellular routing, 511 deployers need to look beyond their borders to make 511 a success with the traveling public. If 511 developers, deployers and operators accomplish regional interoperability through data sharing, then we may achieve national interoperability ultimately as well. This national interoperability may ultimately yield a 511 system where the caller may be asked, "For what City?" like the 411 system. The U.S. *Deployment Assistance Report #4 - 511 Regional Interoperability Issues* addressing this issue may be found at http://www.its.dot.gov/511/511inter.htm.

Below is a list of considerations for the implementers that include the following general system design considerations:

- Arrangements for handling requests for your information from a neighbouring system – data or call transfer.
- The estimated number of callers to need "outside" information and what the nature of that information will be.
- The number of "outside" information sources to be incorporated based on logical travel patterns in the region.
- Availability of data from these "outside sources" to be incorporated into your own system.
- Effort required to integrate data from "outside sources" into your system.
- Existence of 511 and other "outside" telephone systems for calls to be transferred to and the suitability of those systems to accept and handle transfers.
- The cost of call transfers to the outside sources in terms of the number of calls and cost per call.

- Likelihood and acceptability of "dead-end" calls that result from call transfers.
- Identify travel corridors, other regions and neighbours and consider how to include their information for callers to your system either through data sharing or call transfer.
- Recognize that your neighbours are also dealing with this issue and engage them in a two-way, or in some cases, multi-way dialogue.
- Use the SAE ATIS (J2354) standard when developing and upgrading information databases and system communications to facilitate the exchange of information.
- Examine and understand wireless calling areas at the boundaries of your system and develop a plan for dealing with misrouted calls. Especially be mindful of the placement of 511 service signing near a border which may lead to someone calling 511 and not getting through because they are being handled by a switch where 511 is inactive or are routed to another province's 511 system.

If an implementer determines data sharing is preferred, then the following items need to be considered:

- Use the SAE ATIS (J2354) standard.
- Recognize the need to parse and size information to match your system.
- Be careful in menu design not to overload your system with "outside" focus.

If an implementer determines that call transfers are preferred, then the following items need to be considered:

- Address "dead-ends" and inform a caller when they will occur.
- Investigate the ability to have dynamic menu options that recognize the schedule of "outside" services
- Estimate call transfers costs, who will pay them and how to minimize such costs, possibly through existing state contracts.
- Consider only transferring calls to bordering provinces with 511 systems.

4.3.2 PRIVACY

People calling a 511 service are accessing the system, typically, through a home or office landline phone or a wireless phone. It is the duty of the deploying agencies to protect this newly created database of information. Callers using a 511 service expect the deploying entities to protect their individual privacy. If their privacy is invaded, or even perceived to be, the users' confidence in, and comfort with, using the service will wane and the overall usage will drop.

4.3.3 ITS ARCHITECTURE FOR CANADA

The ITS Architecture for Canada is the framework for deploying new integrated Intelligent Transportation Systems in this country. This framework identifies the stakeholders and interrelationships involved in ITS, the activities or functions required to deliver the ITS User Services, and the interdependencies between different systems. In support of 511 and the advent of sophisticated voice portals, the traveller information portion of the ITS Architecture for Canada includes the Interactive Traveller Information user sub-service .

This entity provides tailored information in response to a traveller request. Both real-time interactive request/response systems and information systems are supported, which "push" a tailored stream of information to the traveller based on a submitted profile. The traveller can obtain current information regarding traffic conditions, road and weather conditions, transit services, ride share/ride match, parking management, and pricing information. A range of two-way wide-area wireless and landline communications systems may be used to support the required digital communications between traveller and the information service provider. Successful deployment of this user sub-service relies on availability of real-time transportation data from roadway instrumentation, probe vehicles, parking managers, transit providers, or other means.

This User Sub-Service is related to the Interactive Traveller Information Market Package available here http://www.its-sti.gc.ca/Architecture/english/web/mpATIS2.htm.

4.3.4 STANDARDS

Significant resources have been invested to develop ITS standards that will simplify and expedite the deployment of interoperable systems. 511 implementers should review the full range of standards available and consider using those that will aid in cost-effective system development and / or inter-system interoperability. The ITS-related national standards are designed to facilitate the efficient exchange of information and, as a result, have developed standard data elements and standard messages.

Some of these standards, consistent with the national ITS architecture, are quite beneficial to system implementers in reducing the time and resources required to share information between transportation management systems and the 511 support systems. Existing standards that should be examined include:

- ATIS and ATMS data dictionaries and several "business area standards" from the Transit Communications Interface Profiles (TCIP) family of standards. An example of how these standards can help is the ATIS produced International Traveller Information Interchange Standard Data Dictionary standard, which includes textual phrases and binary codes for over 1,500 types of highway event "descriptors." These codes should be programmed into both the management systems and 511 equipment and only binary codes would need to be transferred between systems to provide information necessary to create route-segment reports. This also has the benefit of largely standardizing the reports that callers hear and aiding their understanding of reported information. The central focal point for learning about ITS standards information is available at: http://www.its-standards.net/

- The primary standard for exchanging traveller information between various systems and users is the J2354 ATIS message set standard developed by the Society of Automotive Engineers (SAE). The messages of this standard are implemented in both ASN.1 and in extensible Markup Language (XML) and include formats for various events, incidents and weather occurrences. The SAE ATIS (J2354) standard has many other important components for 511 systems, including transit information and vehicle routing. Implementing agencies should provide their data sets in the SAE ATIS (J2354) message sets, available at: http://www.sae.org/technicalcommittees/atishome.htm

- Current 511 systems (U.S. installations) receive data from traffic management centres (TMCs) in a standard format developed by the AASHTO / ITE Traffic Management Data Dictionary (TMDD) Committee. "Message Sets for External Traffic Management Centre Communications" (MS/ETMCC) is the exact name of the approved Abstract Syntax Notation number One (ASN.1) message sets which are currently being updated in an "Expedited" standards process. The TMDD Committee has agreed to publish XML versions of its messages alongside ASN.1 in future releases.

- Regional systems employing incident management systems may be using the message set standards of the Institute of Electrical and Electronic Engineers (IEEE) Incident Management 1512 family of standards. These standards allow for multi-agency conduction of incident events and express public summaries of these events using the same formats developed in the SAE ATIS J2354 work. Regional deployment using this set of standards can receive data in this format using either the ASN.1 or XML formats which are provided.

- All of these message set standards re-use many of the same data elements in defining their component parts to increase the coordination between them and leverage the development investment. One key data dictionary in this effort is the TMDD data dictionary that was produced by the AASHTO / ITE TMDD Committee.

Not all of these standards have been fully tested in the field and some may experience changes in the future. However, increasingly more transportation agencies are choosing to use these standards in 511 systems.

4.3.5 EVALUATING SYSTEMS

In order for 511 to be a customer driven multi-modal traveller information service, implementers will need to periodically evaluate their systems. Users' expectations may change over time, much like they have for cellular phones and the Internet. Evaluations will help deployers meet their customer's needs and determine how successful and useful the service is to the callers. Similarly, such evaluations will assist in gauging the success of the system nationally.

Deployers may use various techniques to evaluate their systems, including: on-line surveys, phone surveys, mail-outs with other deploying agency information (e.g. water bills, land assessments, etc.), and convening consumer focus groups. Measures of effectiveness and value may include: area coverage, usage, repeat usage, awareness and customer satisfaction. Deployers may gauge awareness of 511 when doing surveys and evaluations locally by asking:

- Have Consumers Heard of 511? – To gauge overall awareness.

- What is 511? – To see if consumers know that 511 delivers transportation information.

- Have They Used the Service? – To determine if awareness leads to usage.

It is anticipated that each local 511 deployer will assist in the process of collecting and providing the relevant information. While some of the information is fairly easy to collect and can be achieved through the proper design of a telephone dissemination system, other collection efforts will be more sporadic and more dependent on operating funding.

There are current examples of such evaluation processes available from U.S. installations. The evaluations typically cover topics such as awareness, customer satisfaction, applicability of service and other elements critical to providing a customer-oriented service. However, due to the complexity of the evaluations and the financial commitment that they take, many deployers envision only being able to perform such evaluations every two to three years.

5. LESSONS LEARNED IN 511 SERVICE DEPLOYMENTS

Many of the operational 511 services in the United States, and similar Canadian ATIS installations have learned valuable lessons on deploying and operating systems. While not all lessons are applicable to all future deployers, all of the key lessons are important and this section discusses the major issues.

5.1 Successful Systems Are Customer and Market-driven

A 511 service needs to be thought of as an evolving product designed to attract and retain users. They should be based on customer relationship management (CRM) which entails all aspects of interaction that a company (or agency) has with its customers, whether it be sales or service related. They should provide users with features and services that are focused on safety and convenience.

The most successful 511 services will be the ones that listen to their customers and predict, or react to, their needs. One way of offering this interaction opportunity regularly is by having a comment line on the 511 menu tree. A standard customer feedback mechanism allows the deployer to track user's needs regularly, instead of only through ad hoc evaluations, which may include various survey methods.

5.2 Marketing and Branding Is Critical

5.2.1 MARKETING

Operating experience has clearly shown that successful marketing – the advertising of the 511 service and what it can do for its customers – is directly related to use of the system. Add to this that customer usage is the most common measurement used for evaluating a system's success, and the value of marketing cannot be understated. Despite this, it is often one of the most overlooked, or poorly executed components of an ATIS deployment plan.

A number of potential strategies include:

- 'Paid media', including newspaper and magazine advertising, television commercials, radio spots, and roadside signing;
- 'Free media', including launch press releases, interviews and period press releases to highlight new or enhanced services; and
- Building new or improved relationships with broadcast media.

Further marketing assistance can be found at http://www.deploy511.org/marketing.htm. The website offers deployers examples of marketing and awareness tools used across the United States, including billboards, posters, decals and launch materials.

5.2.2 BRANDING

With an abbreviated dialling code of 511, brand awareness is built in by association (a phone number like 411 or 911) and the marketing message is simple, easy to remember and is similar, or the same, across the country. And because the brand is the same across the country, deployers can easily benefit from each other's marketing campaigns and materials.

Strong branding with a successful service has the added benefit of highlighting the good services provided by the local deploying agency, and demonstrating value for the investment in intelligent transportation systems.

Lastly, many deploying agencies in the United States have made third-party users of 511-related information sign memoranda of agreement that ensure adequate recognition of the source of the information. This further advertises the 'brand', thereby spreading service recognition and demonstrating value.

It should be noted that participating agencies with strong existing brands will not need to eliminate their branding. The two brands (one being Canada 511) may be mutually supportive, resulting in higher usage of both systems. Further, Canada 511 may be used as an easy to remember access number for another specific brand.

5.3 Usage Is Event-driven

The majority of 511 services across North America experience usage driven by specific events. These events can be weather-related, incidents or special events. The increase in calls related to an event or series of events can be dramatic. This is a key consideration (probability and frequency of such events) in the system call capacity sizing for the 511 service.

5.4 Consumer Research Results

In a recent electronic survey conducted by the Canadian 511 Deployment Consortium of potential deployment agencies (2004), the following pertinent issues were identified:

- There is a desire to provide comprehensive 'one stop shopping' when it comes to traveller information;
- Road safety are road closure and condition reporting should be the primary mandate of Canada 511;
- The services considered to be the highest priority included road conditions (including events / closures, weather conditions, construction and congestion), trip planning, the ability to provide user feedback, and contact information for the deploying agency;
- Transit agencies would most like to deliver route and fare information, accessible transit information, and next trip arrival time; and
- There is a strong desire to establish data sharing standards amongst deployers.

In addition, research conducted in late 2001 by ITS America revealed that for transit riders, information on delays is most desirable (followed by travel time estimates).

The results of these research efforts are often echoed in local research efforts and are reflected in the design of many of the systems in operation.

Some implementers have performed their own consumer research to determine: what potential users want in a 511 service; how the users will react to the service; and what benefits people expect to get out of the service. On-going consumer research is most effective when performed:

- During the planning stage;
- Once a demonstration system is available (six months to one year after the service is implemented); and
- Every 12 to 18 months thereafter.

5.5 Deployment Costs May Vary Significantly

Deployment costs are highly variable and are based on the: the breadth and detail of services provided, size of the system; the number of calls estimated or received; the duration of the call; number of transfers made between answering points (e.g., transit, tourism call centres); and routing of calls. Costs may also vary with the degree of system automation, and some general costs for various types of 511 services are listed below:

- *Highly Automated, Limited or No Human Involvement in Operation*: These are the least costly systems to establish and to operate. In Arizona, such a system was created for roughly $150,000 CDN, maintenance costs are minimal (roughly $15,000 CDN annually) and telecommunication costs are under $80,000 CDN per year.
- *Automated System, with Human Recorded Information*: These systems are typical of the metropolitan traffic / multi-modal services. To establish such a service could cost $500,000 to $1.5 million CDN. Operating costs vary significantly with the deploying agency's ability to conduct various aspects of the work in-house, versus contracting out the operational component. Contracted operation may vary between $200,000 CDN and $1million CDN, but these figures will vary significantly due to many factors including size of region, hours of operations, etc.
- *Human Operator-based (Call Centre) System*: Typical of transit information services, these systems are the most costly, as many full time staff are be required to provide the service. Many services are paying in the millions to create a trip itinerary planning system that operators can use to more quickly and accurately respond to caller inquiries. An annual operating budget for a large transit information centre can exceed $6 million CDN.

Potential telecommunications costs include (but are not limited to) physical telephone lines, central office and switch translations, potential long-distance tariffs, and a PBX system or service. These are a mix of one time and recurring costs and vary based on the carrier, number of carriers, and the number of central offices and switches in the coverage area.

5.6 511 as a Tool in Major Events

While most major events around the country tend to be weather or incident related, some may be planned events of various sizes, such as the 2010 Vancouver Olympics, the Calgary Stampede, the Quebec Winter Carnival, or the Halifax Tall Ships Festival. Some systems have been developed with special content features designed specifically for major or special events, including driving directions to venues, event schedules and tips for commuters.

511 systems may also play a key role in managing travel in the event of major unplanned events. In the event of major winter storms, road damage that completely shuts down a roadway(s), and vehicle accidents that have a major impact upon road operations, 511 may be an important tool in the hands of incident management authorities.

5.7 On-going Financial Support Is Critical to System Success

The financial commitment that a lead agency makes to a 511 service is critical to the continued success of the system. For this reason, the department or agency must not rely on costs being significantly offset or wholly absorbed by the private sector or through revenue sharing partnerships. While those business models have had some very limited success in the past, the majority have failed, leaving the lead agency unprepared to accept the additional financial burden of operating a system. This has resulted in the service reducing its content, hours of operation or even completely shutting down.

The lead agency also should recognize that, much like providing transit service, 511 does not get cheaper with more usage unless costs are being significantly offset by revenue sharing. While a significant usage increase may reduce the cost per call or per minute, the overall cost of providing the service should be expected to rise.

Along with providing quality, timely, decision-level content, 511 services (like any other customer service) need to be reliable and consistent. Consistency and reliability begin with a financially sound, multi-year funding program.

6. ADDITIONAL RESOURCES

This section identifies key contacts and information resources that can be used by local Canada 511 deployers.

6.1 Canadian National 511 Deployment Consortium

The establishment of the Canadian 511 Deployment Consortium and the activity of its volunteer members have led to the development of a very important national resource. The Consortium members are a key resource and support structure for 511 planning, deployment, operation, marketing, and evaluation information and experience. The Consortium continues to provide a venue for all parties, public and private, interested in providing 511 services to share information and exchange experiences, ideas and foster the promotion and growth of this important service.

Over time, it is anticipated that the Consortium will increasingly provide a number of resources via its website, which is located at: www.511Canada.ca. Feedback and questions may be submitted to the Consortium via this website (see 'Contact Information') at any time.

6.2 American 511 Resources

The U.S. Department of Transportation and the U.S. Deployment Coalition have been active for a number of years in the preparation of materials to support local deployment activities. The two key resources are the Coalition's 'Resource 511' website (www.deploy511.org), and the U.S. Department of Transportation's '511 Travel Info' website.

6.2.1 THE U.S. 511 DEPLOYMENT COALITION

The U.S. 511 Deployment Coalition's 'Resource 511' website (www.deploy511.org) is operated by the U.S. Deployment Coalition, which is a group of public and private stakeholders in the deployment of 511 nationally within the United States. The website contains a number of resources, including:

- The national deployment status in the United States;
- A marketing toolkit;
- Implementation guidelines;
- Usage and evaluation guidelines; and
- Information concerning the Coalition.

This website provides a wealth of information supporting the development of local 511 systems in the United States, and many of the same principles apply within Canada.

6.2.2 THE U.S. DEPARTMENT OF TRANSPORTATION

The U.S. Department of Transportation's '511 Travel Info' website similarly provides a wealth of information concerning practical deployment activities. The website features:

- Executive-level briefing materials for the U.S. 511 program;
- "Deployment Assistance Reports" on various topics, including 'Business Models and Costs Considerations (January 2002)', 'Transfer of 511 Calls to 911 (March 2002)', '511 and Homeland Security (June 2002)', '511 Regional Interoperability Issues (March 2003)', 'Public Transportation Content on 511 (June 2003)', 'Weather and Environmental Content on 511 Services (June 2003)', and 'Roadway Content Quality on 511 Services (June 2003)'.
- 'Lessons Learned' case studies;
- Current deployment activities;
- FCC issues and decisions; and
- A wealth of background materials on the 511 program.

6.3 Operating 511 Systems

The number, geographic and functional diversity of the many 511 deployments to date in the United States has resulted in a wide range of potential installation models to follow. Canadian 511 deployers are encouraged to speak with a broad cross section of deployers to assess the merits and challenges associated with deployments in circumstances similar to their own. A list of agencies with current deployments, and those currently deploying 511 are provided via the U.S. DOT website noted above. Links to these project websites are also available.

7. FOLLOW-UP WORK

As noted in **Section 1**, the *Canada 511 Deployment Standards and Guidelines* have been developed to help guide content, system and process consistency amongst the local traveller information system deployments within the Canada 511 network across Canada. In addition to those issues discussed within this report, there are further guidelines that would benefit local deployers, including (but not limited to):

- Business Model Development;
- Financing Sources;
- Organizational Structures; and
- Use of Alternate Delivery Technologies (e.g. websites and PDA).